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VIEWS, NEWS AND INTERVIEWS.

William W. Hurt, professional gambler, whose operations in New York were exposed by Col. John A. Cockerill, editor of the *Morning Advertiser*, has been interviewed in San Francisco by a New York *Herald* correspondent. In relating the story of his life Hurt tells of a "fake" dice throwing device with which he once made money at the Sacramento, Cal., Fair. Here are his reported words:

"The scheme was a battery concealed under the table and connected by wire with the top. All I had to do was to press a button with my knee under the table and magnetize my dice. I would bore out the ace spots and fill the cavities with steel filings, over which I would paste black putty, and the dice looked as natural as any. When I wanted to win I'd press the button, throw the dice, and, of course, my throw would be five sixes. Then I'd take my knee away from the button and the other fellow would get whatever he was lucky enough to throw, but I'd get his money."

The Brotherhood of Electrical Workers is taking active measures to prevent a decrease of wages for electrical work. Recognizing that supply and demand for labor is an important factor in the determination of the wages paid the workmen, they have struck at the source and have made rules fixing the time of apprenticeship for electrical workers at three years, and thus limiting the number of electricians put into the market. The brotherhood will enforce the rule that every electrician must have served an apprenticeship of three years by refusing to work with any person who has not so served.

Fatal accidents at target practice are happily not as common now as in the early days of the rifle volunteer movement in England, but still there is room for a better method than that in vogue of recording the score of the shooters. A self-recording target, which has just been exhibited in Plymouth, is well spoken of and seems to meet all the requirements of such a device. The face of the target is composed of steel, and the whole surface of the "bull's-eye," the "centre" and the "outer" consists of steel rings, which can be forced back on pressure. When the bullet reaches the target the ring on which it strikes is driven backward, and is forced forward again by a spring. The backward motion of the ring closes an electric circuit, actuating as an indicator at the shooting point, where the result of the shot can thus be instantly seen.

In an installation at the residence of a gentleman at St. Lunaire, France, a windmill is arranged on a masonry tower at a height of 33 feet from the ground, and the power is transmitted by gearing and belt to a dynamo, which charges a number of storage batteries. In this way a current is provided for the lighting of the whole house and for other domestic purposes.

A shooting affray which created much excitement took place at Martinsburg, W. Va., on December 13, between John B. Wilson, cashier of the Citizens' National Bank and president of the Edison Electric Illuminating Company, of Martinsburg, and Marcus Ruthenberg, an electrician, representing the Western Electric Company, of Chicago, in which the principals were not hurt, but several bystanders were slightly injured. Ruthenberg, acting under orders from his company, went to the new electric plant of Mr. Wilson's company to take therefrom a lot of machinery sold Wilson by the Western Electric Company. The place was barricaded and Wilson stood on the inside and fired through the door. Ruthenberg stepped back and emptied his revolver through the door. Both men are under bonds.

The C. and K. Arc Lamp.

This lamp, which has only recently been put on the market by the Craighead & Kintz Company, of Ballardvale, Mass., contains a number of good features, and bids fair to prove a formidable competitor in the field of arc lighting.

It has already recommended itself favorably to the central station men throughout New England, who are proverbially a conservative class, and large numbers of them are now in use.

The construction is remarkably simple, and the manufacturers claim that it is the cheapest reliable arc lamp on the market. There are no solenoids, clockwork or dash pots to stick or get out of order, and its adjustment for any current is accomplished by simply turning a small nut on end of armature opposite poles of main magnets, which has the effect of shortening or lengthening the arc. This feature specially recommends it to stations using both full and divided arc currents.

The lamp is made in three different lengths, and all the parts are interchangeable and can be duplicated at any time.

The longest size is fitted with 14 inch upper and eight inch lower carbons, and this lamp, using five-eighth pencils, is guaranteed to burn from 16 to 24 hours. On this account many of them are being used to replace double carbon lamps.

The C. and K. lamp is also fitted with an effective cut-out, by which the current is instantaneously shunted into the line when the carbons burn out. Each lamp has a detachable extension device by which the globe can be easily and quickly lowered for trimming, and for inside lighting it can be fitted with a dust pan, which slips over the globe holder, and by which the dust can be removed without disturbing the globe.

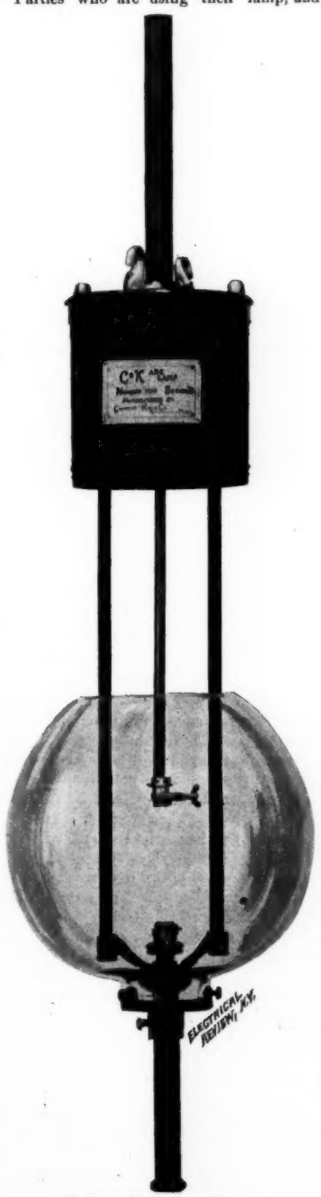
The appearance of the lamp is substantial and ornamental, the house and chimney being made of highly polished brass with a black walnut, brass trimmed hanger board.

The shortest lamp, which is made expressly for use in low studded rooms, and is 32 inches over all, is styled the "Princess," and is meeting with general commendation.

The light is pure, white and strong at a low voltage, and the lamp burns noiselessly and steadily. When properly adjusted there is absolutely no flickering.

The Craighead & Kintz Company have an extensive and well equipped plant at Ballardvale, Mass., and are fully prepared to fill orders promptly. They are old established and well-known manufacturers of oil lamps of all kinds, and are keeping abreast of the times by entering the electrical field, in which they have come to stay.

Parties who are using their lamp, and



THE C. & K. ARC LAMP.

others who have seen it in operation, have remarked on the excellence of its construction and the efficiency and economy with which it does its work.

THE FIREMAN.

A PEEP AT THE WORK OF THIS IMPORTANT AND RESPONSIBLE TOILER.

HIS TRIALS AND TRIBULATIONS—AUTOMATIC STOKERS DO NOT GIVE SATISFACTION—THE HUGE COAL BUNKER—THE FIREMAN PHILOSOPHIZES—BRASS TUBES FOR CONNECTIONS—HIS OPINION OF OIL AS A FUEL—MATTER OF GENERAL INTEREST CONNECTED WITH THIS IMPORTANT BRANCH OF THE POWER-FURNISHING INDUSTRY.

More than 20 years ago, when the trading between Africa and this country was more frequent than it is now, it was very difficult to find stokers who would consent to remain in the holds of vessels in the torrid climate around the Equator. One instance is particularly worthy of mention.

After much difficulty the owners of a vessel had succeeded in obtaining the services of 48 men as stokers, eight of whom were negroes. There were no exhaust fans in the hold of that vessel, and the heat soon became insufferable. The men had to work in shifts of a few hours, and gradually the entire corps of men began to sicken; the confinement and the heat were too much for them; when port was reached but eight men remained alive, not one of whom was white, the negroes being the sole survivors.

Evidently this life is not filled with pleasures, and the work is not what could be called agreeable; but, some men must do it. Nevertheless, there are many grades in the work of a fireman; the hardest is, of course, that above mentioned.

The difficulties lessen by degrees until we come to the fireman, say, like him who had charge of the boilers at the World's Fair. He was tastily dressed in a suit of white duck, and had nothing to do but regulate the supply of fuel, which in this case was oil, and to see that his drafts were all right.

The fireman at the power-house of an electric street railway has work which is similar to that of the so-called engineers in many isolated plants, with the distinction that the latter man must possess sufficient knowledge to enable him to secure an engineer's license, while the former has but to know enough to keep his fires steadily burning.

A new hand learns quickly, but even after

years of plodding backwards and forwards with shovelfuls of coal, there is no improvement, no change for the better, nothing towards a higher state of existence, nothing but shovel all day, with a wife and several hungry mouths to feed when he returns at night.

The position of fireman need not necessarily be filled by a learned man. He has one thing to do, and only one, and that is to maintain required steam pressure. Still, it must be said that among the number of firemen that can be found around this city, there are some who have their ambitions—some who think of things other than the burning bed of the furnace and piles of coal.

Such a one I had the good luck to come across. He was a man who could talk about something other than his regular business, and he very philosophically said to me, "that a man should know something of everything and everything of something." But, then, he was above the average, and in the spare time which he had he devoted his moments to improving himself.

"It is a hard life," he said, "for them that have to work, but it is better than nothing," and as he said this he opened the door of his furnace with a little grunt, and dexterously threw a shovelful of coal so that it would spread just over the part that needed it most.

The hot blast of air made me recoil, and I asked: "How is it that you can stand this heat?"

"Oh," he replied, "eels get used to skinning, and I guess that firemen can get used to this heat." With a slam he shut the door of the furnace, and, leaning on his shovel, stood prepared to answer what questions I might put to him.

"Did you find any difficulty," I asked, "in managing your fires before you got used to the boiler?"

"No," he replied, "fires are just like human beings; sometimes you can treat them one way and they will work good; other times when you do exactly the same thing they will act just like a spoilt child." I smiled incredulously.

"Yes," he continued, "you have got to know just how to treat them, for they have got their humors and sometimes we can't tell what is the matter."

I asked if such a thing as a mechanical stoker could not be used.

"Why," he answered, "they have been tried, but they are not satisfactory. You might as well try to make a flower by machinery."

This remark, coming as it did from a man smoke begrimed and covered from head to foot with grease and powdered coal, seemed rather odd.

"Do you have any variations in this monotonous life?" I asked.

"Well," he responded, "sometimes we do get people in here who ask questions, and that is somewhat of a recreation, although the majority of firemen prefer to say nothing and shovel coal."

"Would you call this place a dangerous one?" I asked, as the head of a hammer, wielded by a workman 20 feet away, whizzed past my ear.

"Well," he replied, "if you judge by that, I should say it was, but I have never seen any serious accidents."

Nevertheless, in order to obtain admittance to this power house, I was obliged to sign a contract, printed on the back of which was the following:

> "This permit is given without consideration, and the person using it thereby agrees to assume, and does assume, all risk and responsibility, and expressly agrees that this company, or any employé, shall not be liable, under any and all circumstances whatever, by negligence of its agents or otherwise, for injury to person or loss or injury to property while enjoying the privileges or within the premises to which admittance is hereby granted. In consideration of the using of the above permit, I agree to the above conditions."
>
> "Handling of machinery or apparatus is expressly prohibited. Photographing or sketching will not be allowed. Visitors are requested not to converse with employés, unless detailed to conduct them."

In view of the fact that only a short while ago, in one of the southern cities, a young man, while inspecting a manufactory, fell into a pit of boiling water and was scalded to death, and sued for damages as the result, the companies issuing permits for admission to their power houses have deemed it advisable that such a contract as the above be signed by the person carrying it. This is collected by the watchman at the door, who returns it to the party who issued it, and thus the companies are presumably exempted from all liabilities in case of accidents.

Looking at the immense pile of coal which had to be shovelled into the furnace, I inquired his opinion of oil as a fuel.

"What do I think of oil?" he asked. "Well, if oil was used, I wouldn't have to shovel coal."

This seemed like a very concise statement of his views, and I suggested that perhaps oil was a better fuel. The answer he gave to this was what might be called unique. "Some think 'tis and some think 't'aint, and I think as they do." Apparently, this man knew how to shovel coal, but very little else, but I found I was slightly mistaken, for I had made inquiries concerning prices on the manner of handling coal, and he showed me some of the latest improvements in that line.

"How long are your hours?" I asked.

"We work in eight hour shifts, there being three sets of men."

"What kind of coal do you use," I asked.

"We have been using Cumberland coal, but we find that pea coal is the better; it costs more, but you get more for your money."

"What does the coal you are now using cost?" I asked.

"We can get this coal delivered to the boiler room for $2.11 per ton."

When we realize that the cost of a ton of coal, delivered in small quantities to the consumer, is approximately $5.50 per ton, we see that there is a big profit being made somewhere.

"What arrangements have you," I questioned, "for storing your coal?"

"In this power house," he answered, "we have a receptacle made of boiler iron, the plates overlapped, so as to obtain the greatest strength for the least weight, which will hold 2,000 tons of coal. The coal is delivered from the river front right at the power house, and is hoisted by elevators to this huge bunker; from here electric elevators carry it to each boiler and thus is the fuel distributed. The ashes, when they are removed, are shovelled into another elevator which carries them to barges, from which the ashes are delivered for road or other purposes, or are dumped far out at sea."

It should be remembered that every ton of coal that is fed the boilers must be lifted by the fireman and distributed as he sees fit.

"I notice that all your tubing is brass," I said.

"Yes," he replied. "Nothing will eat away an iron pipe quicker than boiling water, provided the circulation is slow, but in the case of boiler pipes, where the evaporation is rapid, the hot water has no effect on the iron. For this reason all our connections are made with strong brass tubing."

Every now and then as this man spoke to me I noticed a little blinking in his eyes. "Does the fire hurt your eyes?" I asked.

"Yes," he replied, "but we have to get used to that also."

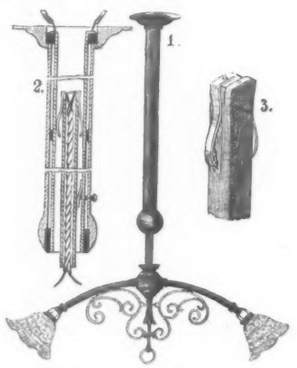
I remember having seen a man whose eyes were bleared and inflamed, and who looked a fit subject for the temperance lecturer, but upon inquiry I learned that he was a teetotaler himself, and that his sole occupation was to watch the bathers at a sea-side resort. The glare of the sun on the water effected him this way, and I wondered whether the firemen were so afflicted.

"Stop here a moment," says he, "and I will show you something." Then he very foolishly opened the door of his furnace and looked steadily at the white heat, for a time which seemed to me interminable, but which was in reality only a couple of minutes. Still it must be presumed that this man valued his sight. To anyone unaccustomed to such work, five or ten seconds would be almost enough to blind them for an hour or so.

The work of a fireman is very monotonous; he has to be wide awake, but it is to be supposed that he finds some pleasure in it. I tried to determine whether this was so or not, and in answering he said, "Do I like it? I have to."

What a story could be told about that short sentence; what a world of meaning it contains. With this last remark the fireman picked up his shovel, and it seemed to me that the moment the load of coal reached the bed of the furnace, there was a load lifted from his mind, for those in trouble can appreciate the value of sympathy. With a sigh he straightened up, and looking me full in the face, said, "The next thing I have to do is to shovel another shovelful of coal into that furnace."

JULIAN A. MOSES.



AN EXTENSIBLE ELECTRIC LIGHT SUPPORT.

An Extensible Electric Light Support.

This improvement, patented by Mr. Alvin Rivenburgh, of Greenfield, Iowa, consists of a tube containing strips of conductive metal connected with the wires of the house circuit, a tube of insulating material sliding therein, and having contact springs contacting with conductors leading to the lamps through the sliding tube. Fig. 1 shows the electrolier complete, Fig. 2 being a transverse section, and Fig. 3 the top portion of the sliding tube. The hole in the main tube is preferably rectangular, and the metallic strips in its opposite sides are flat. The springs contacting with the strips, on the upper end of the sliding tube, are insulated from each other and connected with the wires extending down the inner tube and leading to the lamps. Additional strips of insulation are inserted in the walls of the main tube to prevent the springing of the metallic strips, and, to hold the sliding tube in any desired position, a spring and a set screw which may be made to bear upon it are arranged in the side of the main tube.

Judge Seney's contract for lighting the city of Tiffin, O., with electricity has expired, and the council will soon advertise for bids for another five years' contract. Under the present contract the city pays $88 for lights burning all night and every night in the year, but the increased price of natural gas fuel makes it pretty certain that the next contract will not be so cheap.

GENERAL NOTES.

The capitol at Washington is to have an electric light plant to cost $200,000.

Springfield, Mo., is still talking about municipal ownership of the electric light plant.

The town of Middleboro, Mass., has voted to do its own electric lighting, and will purchase a local plant for $63,000.

The electric light station at Leicester, Mass., was damaged by fire on December 19 to the extent of about $6,000, which is fully insured.

At a meeting of the Bedford, Pa., Electric Light, Heat and Power Company, held recently, Charles C. Raemer was elected manager.

The board of Alderman of Meridian, Miss., has adopted a resolution to purchase the Edison electric light plant for the city for the sum of $14,500.

The city comptroller of New Orleans, La., has been authorized to advertise for sealed proposals for the rearrangement of the lighting of the City Hall building.

Ten machinists in the employ of the Edison Electric Illuminating Company, at Paterson, N. J., went on a strike last week for an advance of 25 cents per day. They were receiving $1.75.

A six foot pulley in the plant of the Jamestown, N. Y., Electric Light and Power Company burst while revolving at a high rate of speed on December 15, badly demoralizing the plant. No one was injured.

The writ of injunction recently served on the city of Rutland, Vt., and the Marble City Electric Company by the Rutland Electric Light Company has been withdrawn and the suit abandoned. The reason for this action is that several defects were discovered in the document.

In an article on Thomas A. Edison's home at Llewellyn Park, a writer in *Cassier's Magazine* says:

The topmost floor is devoted to the accommodation of the younger olive branches and their nurses, and is as cozy and liberal in its arrangements as heart of child could demand. The joint department, consecrated to Masters Tom and William, was surprisingly neat, and betrayed its occupancy only by a litter of paints and brushes. Mrs. Edison exhibited these artistic efforts with a pride scarcely compatible with the usual ogreish conception of stepmotherhood. "Tom has quite a talent in this line," she said; "at least so we all think, and he has a quick ear for music, which enables him to pick out tunes on the piano, and to ask me for any air which may have struck his fancy."

"You do not think he has inherited any of his father's genius?" was asked, and on her reply in the negative we inquired: "Upon which of the children, then, do you think the father's mantle will descend?"

"Well," she replied, laughing slightly, "it seems rather early to pronounce, but still I believe Charles will be the one. Although he is only three years old he has already shown an unmistakable liking for machines, steam cars, etc., and will stand for half an hour at a time, wrapped in contemplation, as if trying to get at their principles."

OUR PACIFIC COAST LETTER.

General Manager H. C. Campbell, of the City and Suburban Road, is recovering from a severe sickness of typhoid fever.

Joseph Simons has been appointed receiver of the East Side Railway Company, at the motion of the Northwest General Electric Company, one of its principal creditors, and with the sanction of its president and treasurer, George and James Steel. Henry Rustin was appointed superintendent by the receiver.

A cable car got away from the gripman on the 21 per cent. grade of the Portland Heights Road, and ran the full length of the hill, some 7,400 feet, before being stopped by the brakes. The faults of the poor grip were redeemed by good brakes and a cool-headed gripman, so that no one was injured and no damage done.

The recent rise of 19 feet in the Willamette river, besides putting a stop to work on the Portland General Electric Company's new power plant at Oregon City, caused the shutting down of a part of their old plant which lights Portland. In consequence, that city was in darkness for several nights until after 11, when the commercial current was thrown onto the street lights. L. W. W.

Portland, Ore., December 20.

Prospects For New Ocean Cables.

FRANCE MAY PREVENT BRITISH CONTROL IN BOTH PACIFIC AND WEST INDIAN WATERS.

There seems now to be some probability that the laying of a trans-Pacific cable between this continent and Australia may be considerably hastened because of the unpleasant awakening which the British imperial government recently received through the successful completion of the Australian-French cable between Queensland and New Caledonia. And not alone this, says a writer in the New York *Sun*, but it is very likely that considerable cable extensions from this continent through the British West Indies, probably to South America, may also result from the same cause, for the events in the Pacific must have aroused the imperial government to the dangerous imminence of a precisely similar situation in the South Atlantic and the Caribbean.

Although the Australian and Canadian governments have for years constantly urged on the home authorities the commercial and strategical necessity for a Pacific cable, they have been entirely unsuccessful in arousing any imperial interest. The West Indian colonies and Canada have been equally persistent and equally unsuccessful in urging like necessity for inter-colonial cable communication among the islands and with the Dominion, independent of foreign connection. A cable was laid recently from Halifax to the Bermudas, but all efforts to have the imperial government co operate in extending it to Turk's Island and Jamaica, and on through the other British colonies to Guiana in South America have failed. Finally the cable company has opened negotiations with the French West India Telegraph Company, and indirectly with the French government, for the extension of the cable from Bermuda to the island of San Domingo. Here it would connect with the company's lines to the French possessions in the West Indies, and the British government is thus in imminent danger of losing control of this line.

It is likely that the negotiations with the French government will go through if the British government allows it, for the former favors the connection, not alone because of the commercial advantages that would thereby accrue to the French islands, but also because it would frustrate the scheme of a cable from Canada through the West Indies to South America touching only British soil. At present all telegraphic communication between Great Britain and her West Indian colonies, or between them and Canada, must pass through the United States and the French and Spanish possessions in the West Indies, or else by a roundabout route, through half a dozen Central and South American and European countries. A Canada-West Indies cable would afford an independent all-British route, connection being made at Halifax with the British Atlantic cables.

It will be remembered that Queensland and New South Wales got tired of waiting for the imperial government to do something toward the laying of a trans-Pacific cable connecting Australia and Canada, through British possessions in Oceania, and co-operated with the French government in subsidizing a French company to lay a cable from Queensland to the French colony of New Caledonia, about 800 miles to the eastward, which was to be the first link in a trans-Pacific cable. It was when this cable was completed a short time ago that the British government awoke to the situation. An aid to the awakening doubtless was the French company's announcement that it was willing to go right ahead with the construction of the succeeding links of the Pacific cable. Canada helped greatly in the arousal by making vigorous protest. Lord Ripon, Secretary of State for the Colonies, sent a circular dispatch to the Australian government, stating the imperial government's objections to the colonies' official connection with the New Caledonia cable, and asking for information as to their position in the matter, especially as regards an extension of the cable eastward under the Pacific.

No official reply has yet been made to this dispatch, but the Sydney *Daily Telegraph* has, in a late issue, an interview on the subject with Sir George R. Dibbs, Premier of the colony of New South Wales. Premier Dibbs said he had not yet decided just what reply should be made to Lord Ripon's communication. "My own impression is," he said, "that what they object to in regard to the New Caledonia cable will oblige them to assist us in finding a route for another cable somewhere else. Some good will come of this, take my word for it." He thought that if Canada had been prominently in the field with definite proposals there would have been no need for Australia to join with the French colony in an eastward cable project. At the same time he averred New South Wales was not committed to the support of any further extension of the French cable. Under any circumstances it was an advantage for Australia to be connected with New Caledonia, the two countries having extensive commercial relations.

Premier Dibbs said there was no doubt that a very powerful influence was at work to prevent the construction of the Pacific cable. By this he meant, doubtless, that the company owning the present cables between Australia and Great Britain *via* India, the Red Sea and the Mediterranean, and which practically has control of all the cables in the world, excepting those in the North Atlantic, the Caribbean and down the Pacific coast of South America, was using every effort to this end.

It may be noted here that while Premier Dibbs denies that New South Wales is committed to any extension of the New Caledonia cable, it was distinctly stated by the Queensland government, when arranging the joint subsidy for this line, that it should "form part of the main Pacific cable, connecting Australia with either Vancouver or San Francisco, or such other part as may be determined." Provision was made for the rearrangement of the subsidy, with "the other countries" or colonies, "as soon as the main Pacific cable is laid."

It is also noted in the Sydney *Telegraph* that the Canadian Minister for Trade and Commerce, the Hon. Mackenzie Bowell, has communicated with the Premiers of the Australian colonies suggesting that a representative from each of the colonies be sent to some central point in Australia to meet him and exchange views upon matters of trade and telegraphic communication between the Australian colonies and Canada. This proposal is interestingly reminiscent of the unsuccessful crusade which was made by the Hon. George E. Foster, Canadian Minister of Finance, a year or so ago in the West Indies, and by proxy, in the British African colonies, in an effort to extend Canada's foreign trade in those directions. Now, in the matter of the cable, Australia offers little encouragement to Canada's overtures. The Premier of South Australia replies to Mr. Bowell that the colony will give him a hearty welcome, but as to the suggested conference it appears useless to endeavor to arrange one in the absence of the co-operation of New South Wales.

It is evident that the imperial and Canadian governments are thoroughly stirred up over the New Caledonia cable episode, and give evidence that they intend pushing the question of the trans-Pacific cable to some definite conclusion. They will need to do something quickly, for the French company announces that it stands ready to continue the New Caledonia cable to San Francisco, by way of the Fiji, Samoan, Fanning and Hawaiian Islands, and they have the great advantage of being already in the field with 800 miles of Pacific cable in successful operation. In any event, the prospect of a speedy completion of Puck's girdle round about the earth by the supplying of the one missing link under the Pacific, seems now most encouraging.

Meantime the British West Indian colonies are greatly stirred up over the probability that the imperial government's inertness and lack of interest in that region will lose to them and to it the prospective cable from Canada through the West Indies to South America, already laid from Halifax to the Bermudas, and now in danger, as is the Pacific cable, of falling into the hands of the French. The imperial government is surely running a great risk in refusing to render that assistance to the company which, under the circumstances, would result in reciprocal benefits of the most important character.

"Apart from what may be termed imperial purposes," says the Kingston, Jamaica, *Gleaner*, "such a cable would be of great value in developing the commercial interests of the colonies. And equally with the imperial authorities it is our duty to look to the future and provide as far as possible against the day of international hostilities when existing friendly areas of supply and consumption may be closed. It would be a most unwelcome and humiliating experience if the colonial and imperial governments delayed too long and the Bermuda line, like the line on the other side of the continent, passed into the hands of the French."

The Electric Car.

BY HENRY LIPPINCOTT.

They tell me thet they're going ter run a sort o' lectric train
From Tiverton to Compton, and oll cut acrost my lane.
I want yer all ter hear me now, and harkin t'all I say;
Fer if they try ter run that hi fa lu tin thing my way,
Ill dynamitem certain, or in some how do em harm,
I won't have that ere lightnin flashin on my chicken farm.

Yer know that feller Dawkins that is farmin by the mill?
Jist ask him 'bout the lightnin, fer it struck his brother Bill,
An' knocked the life right out him—laid him deader than a nail,
An then ter think o' buying it fer running on a rail.
I kaant sees whats got in em cause fer me ther aint no charm.
I won't have that ere lightnin flashin on my chicken farm.

I know its scientific, an' some people think it smart
Ter have the thing ter pull em, stead o' ridin on a cart.
They say "we mus' be stirrin"—an—"the scheme oll make a hit."
"We farmers is too old"—an—"the young mus manage it"
I'm waitin fer the'r hittin, an I'll raise a big alarm!
Ef enny of em try ter run acrost my chicken farm.

Why, the people oll be stricken, all the hosses run away,
The milk all gittin sour, lightnin makes it spile that way.
The hands instead o' plowin, oll be ridin on the thing,
An any amount o' trouble yer the pesky thing oll bring.
I tell you what I'm kickin an oll raise my mighty arm,
If any of em try ter run acrost my chicken farm.

—*Providence Journal.*

The Late Dr. William F. Hutchinson.

At a meeting of the Executive Council of the American Electro-Therapeutic Association the following resolutions on the death of Dr. William F. Hutchinson, of Providence, R. I., were unanimously adopted:

Whereas, It becomes our painful duty to announce the death of Dr. William F. Hutchinson, one of the Foundation Fellows of the American Electro-Therapeutic Association, as well as the first vice-president of the same, and

Whereas, In his death we lose a warm and faithful friend, a valued associate and an accomplished member of the profession; therefore, be it

Resolved, That this Association desires to place on record its appreciation of his genial spirit, his active co operation in the work of the Association and of his deep interest in the scientific question relative to his chosen profession.

Resolved, That we express our sincere regret and heartfelt sorrow at his death.

Resolved, That we tender to his sorrowing family an expression of our profound sympathy in their great loss.

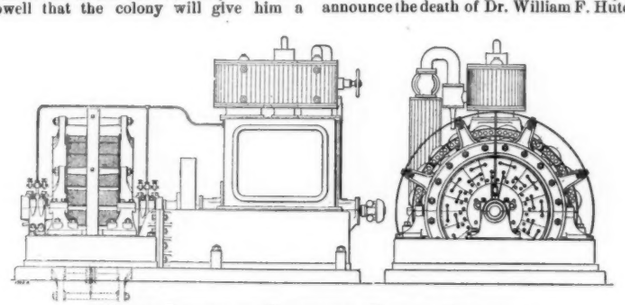
Resolved, That a copy of these resolutions be sent to the bereaved family, to the medical journals, and that they be spread upon the minutes of the Association.

AUGUSTIN H. GEOLET, M. D.
W. J. MORTON, M. D.
G. BETTON MASSEY, M. D.
ROBERT NEWMAN, M. D.
CHARLES R. DICKSON, M. D.
} *Ex. Coun.*

WM. J. HERDMAN, M. D., *President.*
MARGARET A. CLEAVES, M. D., *Secretary.*

New York, December 13, 1893.

M. M. A. Badouin has stated before the French Academy of Sciences that as far back as 1876 he obtained rain by drawing electricity from the clouds by means of a kite. To prove that this was possible, M. Badouin conducted an experiment on October 5 last at about 5.15 P. M. He obtained contact with the clouds situated at an estimated distance of 1,300 yards. It that moment, it is stated, a local cloud was noticed and several drops of rain fell. As soon as the contact ceased, which was effected by hauling down the kite, the normal state of affairs was resumed at 5.30 P. M.



STEAM DYNAMO AT KINGSTON-ON-THAMES, ENGLAND.

Steam Dynamo at Kingston-On-Thames, England.

An electric lighting station to supply 5,000 thirty-five watt incandescent lamps and thirty-five 500 watt arc lamps has just been installed at Kingston-on-Thames, England, by Siemens Brothers & Co., London. Mr. A. H. Preece was the engineer for the installation. The plant consists of seven steam dynamos, the total of 300 brake horse-power being divided as follows:

For incandescent lighting, three steam dynamos, each comprising one of Belliss's self-lubricating compound engines, working a Siemens alternating current dynamo, namely: Two 75 brake horse-power engines and alternating current dynamos, running at 462 revolutions per minute for an output of 24 amperes at 2,100 volts. One 40 brake horse-power steam alternator giving an output of 12 amperes at 2,100 volts and 580 revolutions per minute.

For exciting the alternators there are provided two 25 brake horse-power self-lubricating compound engines, working direct current dynamos, giving an output of 160 amperes at a pressure of 105 volts, the speed of revolutions being 550 turns per minute.

For street lighting there are two 30 brake horse-power engines working continuous current dynamos, giving, at a speed of 550 revolutions per minute, an output of 20 amperes at 950 volts.

The illustration on this page, for which we are indebted to London *Engineering*, shows one of the alternate current generators, supplied by Messrs. Siemens Brothers & Company, who are the contractors for the machinery. It is the size designated by them as 20/3, and running at 462 revolutions, gives an output of 24 amperes with a pressure of 2,100 volts and a frequency of 77 per second. As will be seen, the armature rotates between two sets of stationary field magnets, so arranged that each north pole faces a south pole, and also has a south pole at either side of it. The magnet cores are bolted to two massive cast-iron rings, which are themselves fixed to the bed plate, and are connected together by four stays. In the narrow space between the pole faces of the magnets the armature revolves. This contains 20 flat coils, wound on non-magnetic cores, and fixed to a central spider keyed to the shaft. The connections between the coils are so arranged that two parallel circuits of 10 coils each are formed, each giving the required electro-motive force of 2,100 volts. This armature has practically no reaction on the strong field in which it runs, so that parallel working and regulation are both quite easy. The insulation resistance of the armature is three megohms after six hours' run, and the temperature of the coils, at the same time, is guaranteed not to exceed that of the air by more than 60 degrees Fahrenheit. On an actual test the temperature rise was only 27 degrees.

National Electric Light Association.

The Committee on Arrangements of the National Electric Light Association held a meeting in the office of Col. S. M. Bryan, at Washington, D. C., on December 19. There were present Chairman C. O. Baker, Jr., Col. S. M. Bryan, M. D. Law, F. W. Royce and Secretary Geo. F. Porter.

The Ebbitt House was finally decided upon as the official headquarters of the association during the convention, which occurs on February 28, March 1 and 2, 1894. A special rate of $3 per day has been made by the Ebbitt House for all those attending the convention. The business meetings of the convention will be held in Grand Army Hall, on Pennsylvania avenue, which is next door to the well-known electrical supply house of Royce & Marean.

The construction of electric roads from Hartford, Conn., to New Britain by way of Charter Oak Park and Newington, and from Hartford to Unionville by way of West Hartford and Farmington, will be begun immediately by the Hartford and West Hartford Electric Railroad Company. The lines are to be in operation by April, 1894.

Annual Report of The Board of Commissioners of Electrical Subways of Brooklyn, N. Y.

BROOKLYN, December 15, 1893.

HON. DAVID A. BOODY, *Mayor of Brooklyn:*

DEAR SIR—The Board of Commissioners of Electrical Subways has the honor to submit the following report of work done during the year.

The total length of electrical conductors belonging to different corporations was, at the date of the last report (December 10, 1892), as follows:

MILEAGE OF CONDUCTORS IN BROOKLYN.

American District Telegraph Co.	25
Brooklyn District Telegraph Co.	50
Citizens' Electric Illuminating Co.	251
Eastern District Messenger Co.	8
Edison Electric Illuminating Co.	150
Holmes Electric Protective Co.	9
Municipal Electric Light Co.	195
New York and New Jersey Telephone Co.	11,987
Postal Telegraph Co.	35
Western Union Telegraph Co.	311
Brooklyn City Railroad Co. (trolley).	
Coney Island and Brooklyn Railroad Co. (trolley).	
Atlantic Avenue Railroad Co. (trolley).	
Brooklyn City and Newtown Railroad Co. (trolley).	

The trolley systems were in progress of construction, and the mileage had not been reported.

The total length of wires belonging to the city was reported as 370 miles.

The total length of electrical conductors of all kinds within the city limits at this date, December 15, 1893, is:

	Mileage. Aerial.	Mileage. Underground.
American District Telegraph Co.	25	
Brooklyn District Telegraph Co.	140	
Citizens' Electric Illuminating Co.	265	
Eastern District Messenger Co.	12	
Edison Electric Illuminating Co.		228
Holmes Electric Protective Co	11	
Municipal Electric Light Co.	206	
New York and New Jersey Telephone Co.	4477.47	6957.98*
Postal Telegraph Co	35	
Western Union Telegraph Co.	240	68
Brooklyn Heights Railroad Co. (trolley).	548	164
Coney Island and Brooklyn Railroad Co. (trolley)	21	
Atlantic Avenue Railroad Co. (trolley).	75	
Brooklyn City and Newtown Railroad Co. (trolley).	60	
Stock Quotation Telegraph Co	35	
Fire Department wires	406	

*Including 2620.38 miles suspended from the elevated railways.

The increse of mileage of electrical conductors of all kinds during the year has been:

	Mileage. Aerial.	Mileage. Underground.
Brooklyn District Telegraph Co.	90	
Citizens' Electric Illuminating Co.	14	
Eastern District Messenger Co.	4	
Edison Electric Illuminating Co		78
Municipal Electric Light Co.	13	
New York and New Jersey Telephone Co.	156.67	1873.68
Postal Telegraph Co.		
Western Union Telegraph Co.		
Brooklyn City Railroad Co. (trolley).	548	164
Coney Island and Brooklyn Railroad Co. (trolley)	21	
Atlantic Avenue Railroad Co. (trolley)	75	
Brooklyn City and Newtown Railroad Co. (trolley)	60	
Stock Quotation Telegraph Co.	35	
City wires	41	

THE CONDUITS.

The confidence expressed in former reports in the use of creosoted timber for conduits has been justified by later experience. The durability of the material, when properly prepared, is no longer questioned. The action of a volatile constituent of the creosoting liquid in causing a corrosion of the lead covering of telephone cables was for a time regarded with some anxiety. But this conclusion heretofore expressed is again offered with the greater confidence that is gained by added experience. It may be thus stated: The phenol, which, in the presence of carbon dioxide, rapidly corrodes pure lead, produces but little effect upon the alloy of lead with three per cent. of tin. The phenol, moreover, is volatile and gradually escapes, while the heavier residues remain and prevent decay of the wood.

The Edison Company continues to use the wrought iron tube in which the wires are carefully enclosed in insulating material and which is an inherent part of its system.

THE FIRE DEPARTMENT WIRES.

The telegraph wires in the service of the fire department are owned by the city and are to be retained on poles until an appropriation is made to cover the expense of an underground system. The Board of Estimate has been repeatedly urged to make provision for a small fraction of the city's wires, but thus far without result. The cost of the entire work of converting the aerial to a subway system is so great that a beginning is not yet attempted. The total length of wire in use by the fire department was, on December 1, 406 miles. The cost of construction of conduits and supplying underground conductors for the entire system is estimated by the fire commissioner at about $1,200,000.

Some of the city wires formerly carried on poles along Fulton street are now hung upon the elevated railway. So that a large number of poles await removal as incumbrances.

THE TROLLEY SYSTEMS.

The conversion of horse car systems of street conveyance to the so-called trolley systems is nearly complete within the city limits. Citizens are provided with a more comfortable means of street travel, but they are confronted with a new danger to life and limb when, as pedestrians, they cross the trolley car tracks. So much of the peril as arises from the inexperience of the motor drivers is gradually becoming less, but all that belongs to the high rate of speed remains as a menace to the peace and comfort of the community. The danger increases in proportion to the increased invelocity. The citizen on foot has greater difficulty in avoiding collision, and the motorman has greater difficulty in arresting the motion of his car. Much has been said and written about "fenders" and "wheel guards," but the experience of the last three months leads to the conclusion that although fenders should not be dispensed with, the most pressing demand now is a more careful regulation of the speed.

If limited to the velocity of ordinary vehicles a trolley car in the hands of a competent motorman is no more dangerous than the average express wagon or ice cart, and has as little need of a fender. The track which the car must follow plainly marks the danger line, whereas the devious track of a reckless driver of a wagon defies human provision.

It is urged in behalf of the trolley that the rules require the speed to be limited to an average of seven miles, and a maximum of 10 miles per hour. But as delays are frequent, and as conductors and motormen are held to be culpable if the average is not maintained, it naturally happens that the motor driver will take advantage of a stretch of clear track and exceed the prescribed limit of velocity. Cars habitually pass certain points on the principal trolley lines at the rate of 12 to 15 miles an hour. In the opinion of this board the regulation of the speed is of more urgent necessity than the adoption of an appliance which shall trip and catch or pick up a citizen who is on the track. It is of importance to note that two lives have recently been lost by the impact of the car. The victim was not injured by the wheels. Such safety devices as have been thus far offered would prove lastingly serviceable only under the condition of a perfectly level and smooth pavement between the rails, and for a little distance outside of them. A continuously tinkling bell is also needed as an additional warning, especially in the busier thoroughfares.

Regulation of the speed can probably be accomplished only by a mechanical governor, which will limit the rate of the motor to that required to propel the car at the maximum legal velocity.

The erection of guard wires above the trolley wire has been insisted upon by this board wherever there was danger of accidental contact with wires of another system. As a further measure of precaution, it has been deemed expedient to limit the electric street lights to one side of the streets and avenues traversed by trolley cars. The ordinary plan of alternating the lamps requires many crossings by wires carrying high tension currents, whereby the danger of contacts is much increased. This change of plan has required that a large number of arc lampposts be transferred from one curbstone to the opposite one—a work which is yet not quite complete.

The franchise under which the trolley lines are constructed and operated is construed to include the privilege of stringing the feeder cables along on the poles, which are the necessary supports of the trolley wire. These cables must eventually be put in subways. A plan to bury a group of feeder cables in the southern portion of the city early in the Summer was frustrated by the unexpected opposition of the residents, who objected on the ground that electric currents under the streets would endanger the health of the neighborhood. The temporary injunction granted by the court delayed the work of equipping and completing the road, and so far inconvenienced the traveling public that a compromise measure was deemed expedient, whereby a part of the system was carried on poles and the remainder on the elevated railroad.

CORROSION OF WATER AND GAS PIPES.

One of the inconveniences incident to the introduction of the electric railway system was briefly referred to in the report of this board for 1892, as of uncertain character and extent. It has proven to be of a very serious nature. This is the corrosion of gas pipes, water pipes and the lead covering of telephone cables. Wherever the destructive action has caused a leak, either of water or gas, the fact has been discovered and the injured section removed. These discoveries have of late been so numerous that there seems no escape from the conclusion that metal pipes of all kinds extending below the surface along the routes of the trolley cars are being in many places destroyed.

The cause of the difficulty is now well determined. In many other cities a similar experience has been recorded. The electrical experts are in accord regarding the origin of the injury. The electric current which propels the cars is discharged through the wheels to the rails. If the latter were continuous conductors the corrosion difficulty would not exist. But the imperfect contacts at the rail joints, even with the best devices for providing a path for the current around the joint, impairs the conductivity to such an extent that the earth in the vicinity becomes charged with the current which was designed for the rails, and plays to considerable extent the part of a return wire. Iron or lead pipes extending along the route below the surface become charged with the current. This condition involves a discharge at some point, and here the electrolytic action is established which, bit by bit, carries away the metal, or rather converts it into a compound which in the moist earth is readily detached. When this action is confined to a limited area, as at an abrupt bend in the pipes, the corrosion is rapid; but when it is distributed along a stretch of several hundred feet, as in the case of a Court street telephone cable recently ruined by this means, the destructive action is slower, but is nevertheless constant and sure.

A section of iron water pipe recently brought to the office of this board exhibits a complete perforation which was caused in four weeks. It had been part of a service pipe lying four feet below the trolley track. It is evident that better means must be provided for the conduction of the return current of the trolley system. In a few cases, where a rapid local corrosive action has been discovered, the expedient of making a copper connection between the corroding surface and the return conductor between the rails has been successfully tried.

A more comprehensive plan is in progress of trial on one or two of the electric railways in New England. It consists in welding the rails to continuous length of 2,000 or more feet. The success of this experiment is not yet fully assured.

It should be said in behalf of the electricians of the trolley companies that there has been no lack of vigilance in aiding to discover the locations of injurious electrical action, or in applying the proper remedy.

In view of the fact that the problem of preventing electrical corrosion to service pipes underlying the trolley tracks, is not yet satisfactorily solved. The proposed extension of electric system under a lately granted franchise may be regarded by the city engineers with some anxiety, as a portion of the route lies along the line of one of the largest water mains. Not only should absolute protection from electric corrosion be guaranteed by the trolley company, but constant watchfulness should be maintained without expense to the city.

A special report on the injury to telephone cables may be found in the appendix.

THE ARC LIGHT SYSTEMS.

The public demand for extensions of the arc light system for street illumination has led to projected additions to the central stations, and consequently to the distribution of wires. Evidently this board could not grant permits for any further additions to the overhead system, leading from the central stations, and could only sanction aerial extensions in localities where the street lights had been ordered by the Board of Aldermen and where service from an underground system would not be practicable under the terms of the existing contract with the city.

Negotiations in reference to the location, extent and kind of subway system which should replace the overhead wires have been in progress for some time. Both the Citizens' Electric Illuminating Company and the Municipal Electric Light Company have submitted plans for an underground service, which have been approved by this Board.

Maps filed by the Citizens' Company, showing the route for proposed conduit, and for which permits have been granted, indicate a total length of $13\frac{3}{16}$ miles of subway. The permits issued to the Municipal Company cover a length of $14\frac{3}{16}$ miles.

As fast as the work is completed along the specified routes all lighting from pole systems will be prohibited.

The only poles then left standing within such area bearing electrical conductors will be those belonging to the city.

The special report of the New York and New Jersey Telephone Company exhibits its total mileage of conductors, together with increase of the same during the past year, as follows:

WIRE IN USE.

	Miles.
In underground cables.	4,287.53
On elevated railroad.	2,620.38
On poles.	4,101.97
On housetops.	375.50
In submarine cable.	50.07
Total miles in use.	11,435.45

CONDUIT.

Miles of underground conduit.	23.
Miles of underground duct.	177.
Miles of elevated railroad duct.	13.4

OPERATIONS DURING 1893.

Miles of wire placed in underground cables.	1,047.12
Miles of wire placed on elevated railroad.	8.6.56
Miles of wire placed on poles.	156.67
Miles of wire removed from poles.	544.22

NEW YORK AND NEW JERSEY TELEPHONE CO., GEN'L SUPT'S OFFICE, 16 SMITH ST., BROOKLYN, N. Y., December 13, 1893.

[APPENDIX.]

Hon. Board of Electrical Subways, Brooklyn, N.Y.:

GENTLEMEN—In response to inquiry regarding the action of the escaping trolley current upon the lead covering of our underground cables, I beg to say that five cables have been damaged so seriously as to cause failure and their removal from the underground conduits on Court street and on Flatbush avenue. Investigation shows that cables on Atlantic avenue, Third avenue, Court street, Flatbush avenue and Manhattan avenue are also affected, but not yet seriously. The destructive action is due to electrolysis of the lead cover of the cable, caused by the current, which reaches the cable covering through the earth on its way back to the dynamo, leaving the cable at points where the cable is positive to the earth. We have been able in some cases to reduce the trouble by connecting the cables to the return wire of the trolley road, on poles and underground between the tracks, but as the trolley system is being rapidly extended, and the location of the source of power and the direction of the current both subject to change, we have had much difficulty in securing tests upon which reliable action can be taken. Along Fulton street, where the elevated railroad is used as part of the return circuit for the trolley current, we have so far suffered no injury, and it is probable that safety can be secured along other routes only by the use on the part of the trolley roads of copper returns supplementary to the rails of the track, and of *sufficient size* to carry the current, which now leaks from the rails through the earth to all other metal conductors; much has been done in this direction by the several roads. Our experience would indicate that the safety of metal pipes of all kind placed in the earth, as well as economy of operation, requires that the return system should be complete. Respectfully yours,

J. C. REILLY,
General Superintendent.

ELECTRIC RAILWAY AND POWER NOTES.

After the first of the year it is expected that the street car horse will have vanished from the streets of Providence, R. I.

The long talked-of Deer Creek Railway, which is to run from Belair to Havre de Grace, Md., will be connected with the electric road from Van Bibber, on the Baltimore and Ohio Railroad, to Belair.

The Brooklyn, N. Y., City Railroad has acquired the Broadway lines. The deal was accomplished last week at a meeting of representatives of the companies. The union of the lines will be completed in a few weeks.

Notwithstanding the action of the Philadelphia Traction Company in recently introducing electricity as a motive power over their cable lines, it is reported that the Baltimore Traction Company has no intention of following their example.

President Samuel Little says that for the first time in the history of the West End Street Railway Company, of Boston, the earnings for September, October and November show gross decreases. Notwithstanding that strict economies have been practiced, the net earnings for the three months mentioned also show decreases for each month.

The directors of the Abington and Rockland, Mass., Electric Railroad Company have voted to petition the selectmen of Abington to extend the franchises on Center avenue and Central street, which expire December 31, to January 1, 1895; also, to petition for a franchise on Park avenue that a loop line may be constructed next Spring.

Since electric railways have become such important factors in transportation interests of the whole country in general, and of Massachusetts and New England in particular, there has been a great deal of speculation as to when they would be authorized by law to become common carriers and to carry on express and freight business in the same manner as steam railways. While considerable discussion was going on along this line last Spring, and while the officers of the Lynn & Boston road were wondering if they could get permission from the General Court to carry on this sort of business, a new company, with very little public notice, secured from the Legislature a charter to build a road from Haverhill through Georgetown to Danvers, and section 9 of the "act to incorporate the Haverhill, Georgetown & Danvers Street Railway Company" reads as follows:

Said company is hereby authorized to carry on the express business and to be a common carrier for the conveyance of goods and parcels, subject to the provisions of chapter 70, three of the Public Statutes and of all laws relating to common carriers and express companies.

The Cass Avenue and Fair Grounds Electric Railway, St. Louis.

In 1892 the old Cass Avenue line of St. Louis was consolidated with the Northern Central and Union line, and became the Cass Avenue and Fair Grounds Railway, changing with its name the method of its car traction from the horse to the electric motor. The new company, proceeding along lines dictated by shrewd business acumen, has installed a model power station, and is operating a road which for perfection of construction and operation has few rivals.

The length of the road under the old horse engine was 27½ miles; the adoption of the improved methods, however, speedily developed the line, which is now 35 miles long, and over which are operated 70 cars, built in the car shops of the St. Louis Car Company.

The power house is a substantial brick structure, with a frontage of 168 feet on Prairie avenue. It has a depth of 164 feet, and in location, construction and disposition is peculiarly well fitted to its uses. The engine room measures 164x58 feet and the boiler room 164x50 feet. Between them is a roadway eight feet wide, which runs the entire depth of the building. The room above this is used for storage purposes. In the boiler room, which is 20 feet below level, set in pairs, are six down draught return tubular boilers from the O'Brien Boiler Works at St. Louis. These are 22 feet by 5 feet 6 inches, and have 18 six inch diameter flues, conducting to three sheet steel chimneys, each 100 feet high. A conveyor, running along the floor in front of the furnaces, and operated by a small upright engine, carries away the ashes and loads them on wagons. Two No. 7 Hooker pumps are comprised in the equipment, and the water is heated in a feed water heater of the Excelsior type.

The engine plant consists of four Reynolds-Corliss horizontal engines from the shops of the E. P. Allis Company, of Milwaukee. Three are 1,000 horse-power, each with cylinders 34x60 inches, and the fourth of 350 horse-power, with cylinders 18x36 inches. The fly-wheels of the large engines weigh 65 tons each, and revolve at 92 revolutions per minute; the speed of revolution of the smaller engine is 150. The large engines have been worked up to 1,500 horse-power, or half as much again as their indicated capacity. They take care of the day service, while the small combination is used to run the all-night cars.

The most striking feature of the station is that it is entirely direct connected, the belt driven machine having no place there. It resembles the model railway plant shown in the Intramural power house at the Columbian Exposition. Three General Electric Company's 750 kilowatt, 10 pole, 100 revolution generators are directly connected to the three large engines, and one 200 kilowatt, 6 pole, 100 revolution generator to the smaller. The generators are of the latest railway type, and, like their prototypes at the World's Fair, have already come up to, and even exceeded, specified requirements. The switch board is equipped entirely with General Electric Company apparatus of the usual type, and is also provided with automatic circuit breakers with electrical reset.

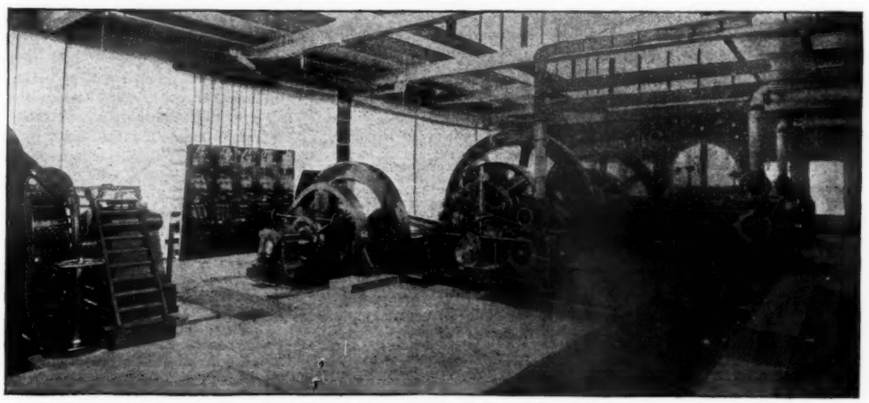


FIG. 1.—VIEW IN THE POWER HOUSE OF THE CASS AVENUE AND FAIR GROUNDS ELECTRIC RAILWAY, ST. LOUIS.

The overhead and line appliances are exclusively from the General Electric shops. The track is built in a substantial manner, and laid with a Johnson 85 pound girder rail, with supported joints, the ties being laid 12 to the rail. Johnson tie plates are also used, but no chairs. The curve rails are 100 pounds, and the poles are made by the Walworth Manufacturing Company.

Each of the 70 cars are equipped with General Electric motors and type E and K controllers, and their operation has not only given satisfaction, but has also elicited high praise. Of the operation of the road as a whole, Mr. McCulloch, vice-president and general manager, has to say:

"We have not had an instant of delay, and only such trifling troubles as are incident to the handling of the new machinery by inexperienced men. I attribute our successful start in electric life to the excellence of the electrical apparatus and devices you have given us. We have operated thus far with absolute freedom from electrical annoyances, and if our plant were to be duplicated I see no reason why we should make the slightest change from the present one."

The Cass Avenue Road may justly be considered as an excellent example of the highest and most recent attainments in street railway practice.

Electrical Engineering in Australia.

An electrical power transmission plant, said to be the first of its kind in Australia, has recently been put down at the Co-operative Colliery, Plattsburgh, New South Wales. The plant, at the pit mouth, which has been put down by the Crompton Electrical Supply Company, of Sydney, consists of a Crompton series-wound generator, giving 300 volts and 15 amperes, driven by a four horse-power Tangye steam engine. Current is conveyed down the shaft by means of two Callender cables to the pumping station in the mine, a distance of about half a mile. Here there is a Crompton motor, giving 300 volts and 15 amperes, driving a Tangye pump capable of pumping 5,000 gallons per hour.

General Electric Company.

The New York *News Bureau* says the Pennsylvania General Electric Company, which leases its territorial rights from the General Electric Company, will probably be united with the parent company at New York early next year, which leaves only one out-of-town department of the company, namely, Chicago. The recent changes in administrative expenses have largely increased the business of the New York office, which now handles nearly 4,000 separate accounts.

It is reported that the Philadelphia Traction Company has closed a contract with the Westinghouse Company for six 1,500 horse-power generators and two 750 horse-power generators.

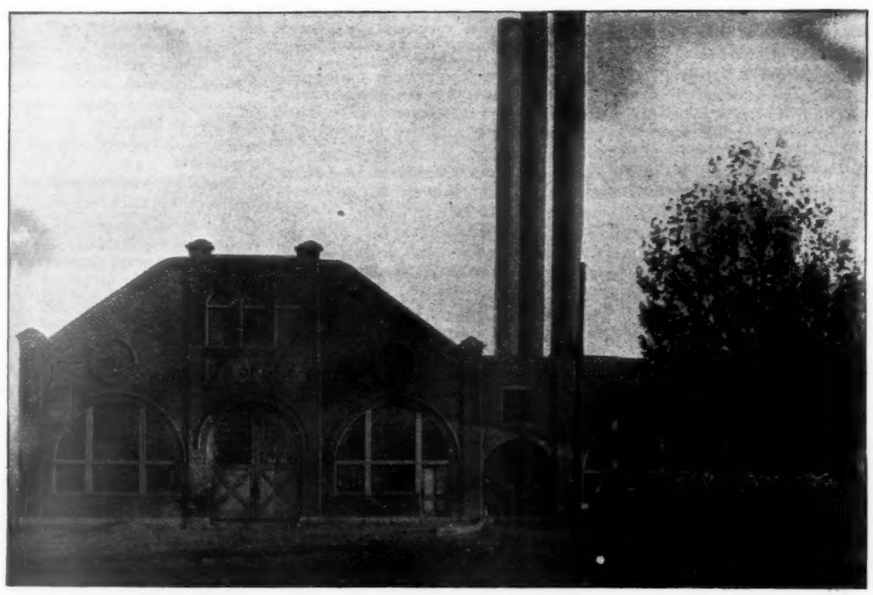


FIG. 2.—EXTERIOR VIEW OF THE CASS AVENUE AND FAIR GROUNDS ELECTRIC RAILWAY POWER HOUSE, ST. LOUIS.

Questions and Answers.

BY OUR "QUESTION EDITOR."

TO THE EDITOR OF ELECTRICAL REVIEW:

On the road where I am a conductor it sometimes happens that something gets wrong at the power house, and suddenly there is found to be no "juice," so that all cars come to a standstill. We have a habit on such occasions of turning on the lamp-switch, so that the instant the current is sent over the line we get the signal by the lamps. Then every motorman tries to start his car immediately, and before the car has gone 20 feet away goes the "juice" again. I know this is caused by the "automatics" in the power house acting because of the simultaneous demand by all the cars for the heavy starting current. Why should not a rule be adopted giving a definite method for motormen to follow on such occasions, so that only a reasonable number would be allowed to start at a time, and so prevent a succession of aggravating stops? F. M.

November 21, 1893.

Your idea is excellent, but it is not new. Such a rule is followed on many roads. Sometimes it goes by motormen's badge numbers, sometimes by conductors' badge numbers and sometimes by car numbers. The order varies according to circumstances at the power house, in the feeder system or total number of cars in service. Conductors' badge number is a good plan. After such a stoppage as you describe, all numbers in the series 1, 5, 9, 13, etc., start their cars. After a delay of a half minute all the numbers in the series 2, 6, 10, 14 start, and so on. By such a rule only one fourth of the cars can draw current, until time is given for these to get down to normal conditions. But keep on working out ideas; you have one of the qualities of an inventor.

TO THE EDITOR OF ELECTRICAL REVIEW:

I have charge on night turn of a couple of railway generators, and they sometimes puzzle me as I am not well posted. One in particular, now and then when heavy loads occur, seems to have a dim red sort of flashing around the legs of the commutator bars. Why is this? I would like to know, as I am afraid of losing my place, as I have had bad luck with the generators and switch board right along. P. M. G.

Buffalo, N. Y., November 18, 1893.

It is hardly good policy to tell you of so simple a thing, but I will be charitable this time. Get a good bristle brush, and every day (or night) when the armature is not rotating, brush out all copper dust from the commutator legs. The trouble arises from this dust causing short circuiting. You are treading on dangerous ground. Get a good book or two on the care of dynamos and study them till you know them thoroughly, or else give up your job at once.

TO THE EDITOR OF ELECTRICAL REVIEW:

Being desirous of taking up the study of electricity with a view of following it as a trade, should my present position fail, I would deem it a favor should you give me a little information how to proceed. I noticed an article in your paper referring to a free evening technical school in Newark. Is there any similar school in this city? Trusting to be favored with an answer, either by return mail or through your columns, I remain,

Yours respectfully,

New York, December 15. J. E. R.

The Young Men's Institute, 222 Bowery, New York, provides an elementary course in electricity. The sessions are free and are held in the evening, I believe.

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EDITOR:
CHARLES W. PRICE.
ASSOCIATE EDITORS:
STEPHEN L. COLES.
ROBERT H. READ.

REGISTERED CABLE ADDRESS:
"ELECTVIEW," NEW YORK.

1546 "CORTLANDT," TELEPHONE CALL.

BOSTON OFFICE:
H. G. TUCKERMAN, Room 29, 620 Atlantic Ave.
CHICAGO OFFICE:
FRED. De LAND, 565 "The Rookery."
WASHINGTON OFFICE:
GEO. C. MAYNARD, 1409 New York Ave.

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THE ELECTRICAL REVIEW EXTENDS TO ONE AND ALL ITS BEST WISHES FOR A HAPPY AND PROSPEROUS NEW YEAR.

We shall have some lively times in telephone circles during 1894. But you who are not protected by an American Bell license should be very careful.

An able and timely paper by Mr. D. Ashworth, relating to boiler firing and management, appears in this issue. This subject is one of great importance to every station owner in the country.

Remember that the next meeting of the National Electric Light Association is at Washington, D. C., February 28 and March 1 and 2. An interesting programme is promised—and it is a good time and place for electric lighting men to get together.

The Fort Wayne Electric Company has met with popular favor that, in view of the financial depression, is quite remarkable. The explanation given by the chief of the company is stated in two potent words: "Good apparatus." There is a volume in these two words, and the ELECTRICAL REVIEW is glad to recognize their meaning.

In this our last issue of the year 1893 the ELECTRICAL REVIEW desires to express its thanks to its numerous patrons for their uniform kindness and assistance during the dark days of the past six months. We feel that our patrons are our friends. Every call made on them brought a response pleasing to the editor and of value to the treasurer. It is a great gratification to have such people to transact business with.

The reduction in the price of incandescent lamps, enabling the consumer to obtain them in large lots at the low figure of 29¼ cents, has caused quite a little stir among the several rival lamp manufacturers. Meanwhile the consumer benefits the most by this drop. As it is estimated that the cost of manufacturing a lamp is in the neighborhood of 19 cents, it can be readily seen that a drop still lower would not be felt so much by the larger companies. It is the smaller manufacturers that suffer most.

A CHANGE IN DATE OF VOLUMES.

The volumes of the ELECTRICAL REVIEW beginning next week will end with the calendar year, two volumes to each year. As the ELECTRICAL REVIEW was started in the month of February, volumes in the past have begun with that date, but for convenience in binding and filling the many orders received for bound volumes the date will be changed so that the half yearly volumes will begin with the first issue in January and July, respectively.

It is stated that one division of the two devoted to electricity in the Patent Office is within two months of being up to date, and the other within about five months. This is a decided improvement, and there is now a ray of hope that this busy department may yet entirely catch up with its work. During the past-depressed year there was a noticeable falling off in applications.

How would this look as a defense for the infringing lamp manufacturers?

"In view of the fact that we believed that the Edison lamp patent would be thrown open to the public upon the expiration of the English patent (for upon the face of the patent a request is made asking that the life of the United States patent terminate with that of the English patent), we incurred a heavy expense in establishing extensive works, etc., and we, therefore, think that we should be permitted to continue in our work, which would not have been commenced had we not believed that the patent as it appeared was in proper form and valid."

As a suggestion coming from a recent manufacturer of infringing lamps this unique defense is submitted.

Anecdotes and reminiscences of the late Professor Tyndall are coming in thick and fast. A writer in London *Lightning* mentions this incident:

I once attended a lecture at the Royal Institution, the subject being "Whitworth's Planes." The great engineer was in the chair. Tyndall's object was to show that the powerful cohesion which takes place between these "planes" arises, not from atmospheric pressure, as it was usually explained, but from molecular attraction; and, in order to make the experiment crucial, he suspended the planes in a large receiver, with a heavy weight attached to the lower one. The receiver was then exhausted and, by means of caustic potash and carbonic acid, the vacuum was made as perfect as possible. The evidence was conclusive; the lower plane, with its heavy weight, remained firmly adhering to the upper.

We have heard of several large corporations that pursue an ingenious and altruistic policy when it is necessary to cut down a force of employés. Instead of discharging a half or a quarter of their men or shutting down their plants entirely, they have suspended, say, 20 men for a week. Then these men are taken back again and 20 more are suspended, and so on. At this rate, in one instance, the men lose about a week every three months, or about one month a year. They can much better afford to lose a week every three months than to be laid off entirely for a month all at once. The plan seems to be a very sensible one, and where it has been tried it has received the hearty endorsement of the employés, which is a great point in these days of tension between capital and labor.

A story comes from Norwalk, Conn., which illustrates one phase of the fire hazard from electrical causes, and may furnish a key to many of what are termed mysterious fires. The home of James Sutherland narrowly escaped destruction from a fire directly traceable to electric causes. An electric road passes the premises, and it appears that the return current followed an iron water pipe into Mr. Sutherland's cellar, switched off onto a gas pipe at a point where the two were in contact, and followed the latter to the meter, where it melted the lead connection and ignited the gas. The flames had communicated to the floor timbers when they were discovered, but a neighbor turned off the gas and the fire was extinguished without the aid of the firemen who responded to an alarm. The cause of the fire was discovered by accident. One of the firemen happened to touch the water pipe with a piece of metal, whereupon there was an electrical display that startled the entire party and revealed the cause of what would otherwise have been a mysterious fire.

ARTESIAN WELLS FOR ELECTRIC LIGHTING.

The cities and towns that are not fortunate enough to be near a flowing stream, or so situated as to be easily reached by coal cars, have another resource for power. Artesian wells furnish the means, and experiments in South Dakota have shown that they are not only an excellent source of power, but that they are economical and inexpensive to maintain.

Near the city of Redfield, S. D., what is known as the Hassell-Myers artesian well has been furnishing sufficient power to serve the needs for lighting the city. It was originally intended for irrigation purposes, and the cost of its complete construction was $3,000. Sinking to a depth of 1,030 feet, the bore of the well is lined with piping from top to bottom, while outside of this six inch pipe, extending from the surface down through the drift for a distance of 150 feet, is an eight inch pipe which serves as a strengthening casing. The water comes from a stratum of clear, white sand, and is soft and clean. The flow is 2,027 gallons per minute, and the entire volume of the water is thrown 16 feet above the pipe. From a two inch opening the water is thrown 158 feet into the air. The closed pressure of the well is 165 pounds to the square inch, and with a two inch pipe the pressure is 128 pounds, while with an opening three-fourths of an inch larger, it is but 95 pounds.

With a home-made water wheel 50 horse-power is being developed, and the Pelton Wheel Company claim that with their wheel at the 2¾ inch opening, the well will be good for 100 horse-power. At the present moment two dynamos are installed, and furnish current for the city for both arc and incandescent circuits. The lights are remarkably steady, and there can be little doubt of the success of the experiment, if it may be so called.

One mile from this well is another of smaller diameter but of equal pressure. The sand formation in which the water is found crops out at the base of the Rocky Mountains, and also in the beds of the Upper Missouri and Yellowstone rivers. If such be the state of affairs and the beds are the same stratum, the supply of water would be comparatively inexhaustible.

Wells could be sunk in hundreds of places in the vicinity of Redfield, and the water thus obtained could serve as the power for numerous isolated plants. The wells now in existence have been flowing for nearly two years, and no diminution of the supply is apparent.

Here, then, is a fertile field for small and even large manufacturers, and if the industry is successfully managed great inducements could be offered.

The owners of the plant state that it pays a yearly dividend of 15 per cent. on an investment of $15,000. The prospect is glittering enough. Who could ask for more?

ELECTRICITY IN JAPAN.

Stejiro Fukuzawa, editor of our esteemed contemporary, *Jiji Shimpo*, of Tokio, Japan, writes that "electricity seems to have a very large field in Japan. We have telephone exchanges in Tokio, Yokohama and Kobe. The number of subscribers at Tokio is about 1,500, and is rapidly increasing. There is a project of constructing an electric railway in Tokio, to take the place of a horse railroad now in operation. Many private dwellings and most of the large offices in Tokio are lighted by electricity. You would find it very interesting to see for yourself how the Japanese are taking up and utilizing the results of American invention." The Japanese have the faculty of adaptability highly developed, and it does not take them long to appreciate the good and bad qualities of things. There are now in Japan a considerable number of native electrical engineers of ability, most of whom have received their professional education and training in American technical schools and American workshops.

CORRESPONDENCE.

OUR WESTERN LETTER.

Mr. Harry Bishop has returned to Chicago from a successful Western trip, and is located at 934 Monadnock building, the headquarters of the Electric Heat Alarm Company.

Wiley & Phelps, 1422 Monadnock building, Chicago, have secured the general agency for the De Laval steam turbine, and are now taking orders for turbines ranging in size from five horse-power to 500 horse-power.

Mr. John P. Hopkins has been elected mayor of Chicago to fill the unexpired term of the lamented Carter Harrison. Mr. Hopkins is a progressive citizen, and the outlook for lighting and rapid transit lines is very good.

An Ideal Lamp.—Having no exposed binding posts, a single carbon rod operated by the simplest of mechanism, strongly incased, requiring no hood for protection, and giving perfect service in all night lighting, is the commendation recently passed on the Standard Electric Company's arc lamp.

Mr. Clift Wise has been appointed manager of the Western office of the Complete Electric Construction Company, of New York, and has established his headquarters at 1401 Monadnock Block, Chicago. Mr. Wise has had an extended experience in cable and electric railway construction, and in the designing and supervising of isolated and central lighting plants.

The Rice Machinery Company, 166 to 174 South Clinton street, Chicago, has opened a branch office at 93 West Water street, Milwaukee, and placed Mr. Wm. L. Phillips in charge. Mr. M. W. Mix, the treasurer of the Rice Company, is more than pleased with the final outcome of the year's business, the aggregate volume exceeding that of 1892 by more than 80 per cent.

City Electrician John P. Barrett has sold the West Side lighting plant of the city to the Metropolitan L, receiving in payment therefore a check for $100,000, which has been deposited to the city's credit, and a lot on Polk street, on which a new lighting station with improved machinery will be erected. The old station was sold because it was in the line of the proposed extension of the L road.

Five Hundred Volt Power Circuits.—Users of electric power in Aurora, Joliet and other Illinois towns are reported to be worried over the recent insurance ruling directing the cancellation of policies on buildings in which motors are used that receive current from trolley circuits. This order will probably necessitate separate circuits for motor service, and may seriously retard the growth of the motor service in the smaller towns.

Mr. Edwin R. Harding, The Rookery, Chicago, within the last 30 days has sold 12 motors of the following sizes: Two of one-sixth, two of one-quarter, four of two, one of three, four of five, one of 15 and one of 20 horse-power. Also one 50 light incandescent dynamo and several of Harding's automatic rheostats. This is a remarkable record under present financial conditions, and the writer would be glad to learn of any better record.

Paiste's Switches.—The Metropolitan Electric Company, 522 Monadnock Building, Chicago, report having secured the output of H. T. Paiste's factory, including the eccentric switch that has attracted so much attention, the Paiste ceiling cut-out for open and concealed work, main and branch cut-out, of the Edison and other types, T-H lamp clutches, etc. This factory is completing a set of switch and cut-out boards for the Ryerson Laboratory at the Chicago University.

Prof. Wilbur M. Stine, director of the department of electricity of the Armour Institute, Chicago, in addition to his other duties, will have editorial charge of the monthly magazine *Electrical Engineering*, and of the monthly summary of current electrical literature, which heretofore has borne the title of *De Land Synoptical Index*, but hereafter to be published under a separate cover bearing the title of *Electrical Literature*. Mr. Fred. De Land will retain the business management of both publications.

Terminal Facilities.—The Central Construction Company, Chicago, is planning a series of loops to accommodate the elevated roads that are now, or that may come, in operation during the next 50 years. Months may elapse before the work is started, but with such men as Marshall Field, Norman Williams, W. E. Hale, C. N. Fay, N. B. Ream, Otto Young and J. W. Ellsworth in the directory, good results may certainly be expected. The capital stock is only $50,000, and has all been subscribed for by 50 progressive citizens, no one subscriber being allowed to have more than one-fiftieth of the total amount. The importance of this work can only be appreciated by persons familiar with the limited area in which business in Chicago is transacted, and the need of getting the people off the streets.

Chicago, December 23. F. DE L.

OUR NEW ENGLAND LETTER.

The Central Railway and Electric Company, of Hartford, Conn., have just placed a contract for the extension of their lines from Hartford to New Britain.

The Deane Steam Pump Company, of Holyoke, Mass., have been obliged to order a still further reduction of working time, and are now running only two days a week, Tuesdays and Fridays. This gives their men but 16 hours pay where they should be earning 60, but the reduction was found to be absolutely necessary.

Attleboro capitalists are becoming alarmed at the prospect of the absorption of the Interstate Electric Street Railway lines in the towns of Attleboro, North Attleboro, Wrentham and Seekonk by the Union Traction Company, of New York and New Jersey, and are taking steps to secure it themselves. The property has been examined by experts in their interest, and if given an opportunity they will undoubtedly purchase it themselves.

The Crosby Steam Gage and Valve Company, of this city, were awarded no less than 10 first medals and diplomas for their leading specialties at the World's Fair. These included their marine and locomotive pop safety valves, revolution counters, engine indicators, double pressure gauges, siphon valves, feed water regulators and pressure gauge testers. This is strong testimony as to the excellence of the goods they manufacture, and is certainly well deserved.

The First Step towards the solution of the rapid transit problem through the congested districts in the business portion of this city was taken early this week, when the board of aldermen voted for the construction of a subway under Tremont street, and for the widening and extension of the street itself at the northern and southern termini. This rapid transit problem has been the subject of almost as much discussion here as in New York, and it is hoped that the recent action of the aldermen in at last taking some decisive measures may lead to something of a practical nature being accomplished. The plan proposed is generally favored by the public, and if the common council concurs it will assure an outlay of at least $2,000,000. Public improvements of all kinds should be pushed ahead at this time, and employment furnished by the city and State authorities to as many of our idle thousands as they can use.

The Proposition of equipping the central office of the water department of Boston with electrical apparatus for showing the supply in the reservoirs, the pressure on the mains, and the condition of the numerous gates, is receiving considerable attention by the heads of the department at the present time. The benefits of such a system cannot be overestimated, as it obviates the possibility of danger and waste through the negligence of employés, and enables the superintendent to have the workings of the entire department constantly before him. By this means he could tell at a glance the height of water in the different storage basins, any sudden variations in which it is important he should know at once, and also the condition of all the gates, whether they were open or shut. City Engineer Jackson and Electrician P. A. Dowd have the matter in charge, and are endeavoring to devise a system which shall be thoroughly efficient and practical.

After reading the interesting contribution from our witty correspondent in Tuskegee, Ala., whose letter appears in our issue of December 20, I am overwhelmed with confusion, and feel that an apology is due to Mr. Cabot for the typographical error which has been the cause of bringing him into such prominence, in what I presume is to him a new line of enterprise, and submitted him prematurely to the criticisms of an expectant but doubting public. While deeply regretting the necessity of disappointing our friend, "T. M. M.," and his still more unfortunate neighbor, I must, nevertheless, in the interests of truth, affirm that to my knowledge Mr. Cabot has not as yet taken upon himself the responsibility of putting a "Twin Detector" on the market. Now that the subject has been brought to his attention, however, and realizing the immense importance and benefit of such an instrument to mankind, and incidentally to the partner of his joys and sorrows, Mr. Cabot may be induced to give the matter his serious consideration. This much I will unhesitatingly affirm—if he undertakes it he is amply capable of putting it through, and would undoubtedly make some suitable provision in the case of an "overload," so no uneasiness need be felt on that score. Mr. Cabot is a modest and unassuming man, but he has encountered and overcome worse difficulties than this before now. "Hope springs eternal in the human breast," and in this age of miracles nothing is impossible; so I would advise "T. M. M." and his interested neighbors to keep an eye, both eyes, in fact, on the columns of the REVIEW, for here, if anywhere, they will find recorded any invention which may tend to enlighten and instruct humanity. H. G. T.

Boston, December 23.

Wall Street and the Electrical Stock Market.

There is a heavy short interest in the market at this time. Were it not for the fact that money is very easy and must necessarily continue so very serious complications might arise that would carry values lower. Owing to the ease of money it looks to us as if the condition of the country had been about discounted, and because of this heavy short interest we look for a sharp rally next week.

Western Union suffered from bear attacks and the selling of long stock based upon the idea that its dividend will be in danger if present conditions continue. The highest price reached was 87⅝ on Tuesday, and the lowest 81¼ to-day. Prominent operators look for 80 for the stock, at which figure they believe it will turn. The Collateral Trust 5's sold at 106½ to 107. One sale of Debenture 7's was made at 112½.

American Telegraph and Cable stood up remarkably well, considering a decline in Western Union, the last sales being at 87 and 88.

While General Electric lost ground during the week, selling from 59½ on Monday to 36½ to-day, the decline was on normal when the slump in the general market is considered. Taken on the whole the market was strong, as it showed good rallying power. Previously it has been the first to lead the decline. The Debenture 5's showed some strength, selling at 73¼ to 74. Our news columns set forth some interesting facts concerning the physical condition of this property.

There were no sales of Edison Electric Illuminating during the week. The first 5's sold at 104. North American was quoted 3½ to 4½.

On the Boston Exchange Bell Telephone was strong at 190 to 193. Erie Telephone advanced from 42¾ to 48, the latter being the closing. General Electric sold from 60 to 64 and was strongly held. The quotations of New England Telephone was 53 to 51, the latter being the closing. Fort Wayne Electric was bid 3½. Westinghouse Electric first preferred was bid 47 and held at 28. The assenting certificates were bid 24 and held at 25.

New York, December 23.

PERSONAL.

Mr. A. H. Lewis, of the Curtis Electric Manufacturing Company, Jersey City, N. J., returned to New York last week after a successful business trip in the West.

Mr. P. C. Ackerman, manager of the New York office of the American Electrical Works, of Providence, R. I., is convalescing from a severe attack of *la grippe*.

Mr. George A. Redman, of the Rochester, N. Y., Gas and Electric Company, has been elected president of the old pupils association of No. 14 School, of Rochester.

Mr. U. T. Fackenthall is no longer interested in the Electrical and Mechanical Engineering and Trading Company, of New York, and has resigned the positions of vice-president and general manager.

Major Thos. H. Winsor, of Portland, Me., assistant superintendent of the first district of the Postal Telegraph Cable Company, has resigned his position and accepted the superintendency of the northern and eastern branches and agencies of the Baldwin Brothers' Banking and Brokerage Company, of Boston and New York.

Mr. Union Noble Bethell and Miss Donna Isabel Brink were married December 5 at the First Presbyterian Church, Brooklyn Heights. Mr. and Mrs. Bethell will be at home to their friends at the Hotel San Remo, Central Park and Seventy-fifth street, New York. Mr. Bethell is the general manager of the Metropolitan Telephone and Telegraph Company, of this city, and the best wishes of a host of friends and of the ELECTRICAL REVIEW go forth to him and his charming bride.

An Acknowledgment from Mrs. Reckenzaun.

TO THE EDITOR OF ELECTRICAL REVIEW:

Will you allow me space in the columns of your journal, which numbers amongst its readers so many of my late husband's friends, to thank them for sending me in such numbers letters of sympathy and condolence?

Their number is far too great for me to reply to them individually, and I hope you will give me this opportunity of expressing to them my warmest thanks, and the gratification it is to me to know how universally my husband was beloved and respected.

I am, sir, faithfully yours,

E. RECKENZAUN.

34 Hemberton Road, Stockwell, S. W.
27th November, '93.

GENERAL ELECTRIC.

A LITTLE OF THE GOSSIP ABOUT THIS GREAT ELECTRICAL COMBINATION.

The recurrence this week of the persistent rumors that General Electric is threatened with a receivership, and that such receivership would be the first step in the separation of the Thomson-Houston from the General Electric Company, led to an investigation by the financial editor of the ELECTRICAL REVIEW with the results as follows:

Vice-President Griffin was asked if such a separation could be possible. He replied in substance that it would be a physical impossibility. When the Thomson-Houston Company was consolidated with the Edison General Electric, forming the General Electric, it lost its identity as a separate property, and in consequence no longer exists. There is no Thomson-Houston Company to-day. Its stockholders accepted stock of the General Electric Company, turning their Thomson-Houston securities into the General Electric treasury in payment therefor. As a result no one can be found to-day who can claim to be an owner of the Thomson-Houston Company except the General Electric. Thomson-Houston cannot withdraw because it is owned by General Electric and because its owners, General Electric, do not wish to have it withdraw. General Electric has the power of selling any of its subordinate companies, and might sell the Thomson-Houston if it so desires. The same can be said in a general way of any other corporation or an individual possessing assets.

A point which has undoubtedly given rise to this rumor of separation is that the Thomson-Houston stock is still held in the General Electric treasury, and that the Thomson-Houston Company preserves its corporate existence. The General Electric is its owner.

In a talk with other officials of the company, it was learned that the Brush Company, of which the General Electric is a large owner, has not intimated that it desires to terminate relations or in any way change them. The Fort Wayne Electric, which rumor said was also about to withdraw, is not controlled by General Electric. General Electric owns some of its stock and to the extent of this ownership has a say in this company's affairs. It is an independent agent in the trade and may become still more independent.

Concerning the stories that the Lynn factory was about to be closed, and the works concentrated at Schenectady, an executive officer of the company said that Schenectady would in time be the center of manufacturing operations of the company. Its technical and designing forces, and the manufacture of intricate and heavy machinery will be based there. This, however, does not mean that the Lynn factory will be abandoned. On the contrary it will be kept in operation, being used for the manufacture of stock material and other goods of the ordinary type, not requiring the elaborate machinery, which will be in use at the Schenectady factory.

The Boston office is not to be merged into the New York office, but in time will be so arranged as to be the financial office of the company. This is regarded as desirable, as Boston is a better center for electrical securities than New York. The executive and business officers will be centered at the Edison Building, 44 Broad street, this city. These changes have been going on for some time, and will probably be consummated within the coming year.

The General Electric Company is now said to be very easy financially. This is evidently correct. The last subscription payment of the Illuminating and Railroad Property, the trust formed to take over the treasury assets of the General Electric Company, supplying, therefore, $4,500,000 with which to discharge the floating debt, will be paid on January 15. When this is applied the floating debt will be liquidated. In the meantime it will not give the company any trouble.

New York, December 23.

The Electrical Transmission of Power From Niagara Falls.

ABSTRACT OF AN ADDRESS READ BEFORE THE INSTITUTION OF ELECTRICAL ENGINEERS, LONDON, NOVEMBER 9, 1893, BY PROF. GEORGE FORBES.

(*Concluded from page 214.*)

With regard to the dynamo, the Cataract Construction Company at first invited many different manufacturers in Europe and America to submit plans. The number of these that were submitted altogether amounts to 24, some of the manufacturers having taken a great deal of trouble to submit a series of designs, in order to be able to meet different requirements. Many of these designs were extremely good; but it was determined, after estimating the increased cost of using the European designs, owing to the high tariff in America, and owing to transport, to have the machines manufactured in America. Among the designs from American manufacturers, there were none which fulfilled all the requirements of the case, and eventually the Cataract Construction Company decided to get out their own designs and to submit them to the American manufacturers for tender. I had been for some time previously engaged in working out a design which I am confident none of the manufacturers who had sent in designs could say was in any way borrowed from their ideas. We had received suggestions of an external armature with internal revolving fields, and also of external fixed fields and internal revolving armature. We naturally had a preference for a dynamo with a fixed armature, because the coils can be more securely wound, and are not subjected to the mechanical stresses induced by centrifugal force. But all the designs with revolving fields which had been submitted to us contained a weak feature. At the same time, the turbine makers had insisted upon having a certain momemtum, or fly-wheel effect, which was not given by the revolving parts of any of the dynamos submitted to us, and it was found that if any one of these had been accepted it would have been necessary to add to the design a fly-wheel of large dimensions. Centrifugal force was one of the most important matters to be considered, because at 250 revolutions per minute this force assumes considerable magnitude in the large masses with which we had to deal. Moreover, in all the designs which had been submitted, the magnetic pull between the poles and the iron of the armature assisted the centrifugal force. The principal feature of the design upon which I was working consisted in having the armature fixed, and inside the machines, with the fields revolving outside; the fields being formed of a ring of iron with the poles projecting radially inwards. One advantage is that we are able to get the full fly-wheel effect that was required by the turbine makers. This requirement was that in the revolving part the sum of the weight in pounds of each part, multiplied by the square of its velocity in feet per second, should equal 1,100,000,000. The design also gives an extremely good mechanical construction for the revolving parts. The iron ring which forms the yoke of the fields serves as a support to hold in the pole pieces and the exciting coils, and no part is held in against centrifugal force by bolts or keys. Moreover, the magnetic pull between the fields and the armature acts in opposition to, and does not assist, the centrifugal force. The armature is fixed, and a large space is available inside it for the workmen to attend to the bearings, and to reach any part of the armature. It is obviously possible to insulate the armature coils for any electric pressure. With a large machine of this kind the space occupied by insulation has not the same importance in reducing the output of the machine as is the case with machines constructed in the past. In fact, the armature coils can be wound with the same insulating properties as a transformer, and hence the necessity for using a step-up transformer can be avoided.

Starting with this general principle, I first got out designs of a machine at 33 periods per second, in order that I might compare the general appearance of such a machine with those of other types. The next point was to design a machine of as low a frequency as was possible under the limiting conditions as to weight. The revolving parts of the turbine and dynamo and the shaft connecting them are supported by a hydraulic piston, and it was the desire of the Cataract Construction Company not to use a thrust bearing of any kind to support the weight, although there is a thrust bearing at the top of the shaft, which simply acts to retain the apparatus in a fixed position in a vertical direction. Owing to this decision, it was necessary to limit the weight of the revolving parts of the dynamo to 80,000 lbs. In getting out the design for this machine it was desirable to select such a form of winding as past experience led one to believe would be most efficient for parallel working, and I judge from past experience that this is best attained by having the number of coils per pole very small.

It will be seen that from the necessities of the case at Niagara Falls, the dynamo which was required differed in some respects from what would be necessary in many other cases; but it is equally obvious that in any case of so large a transmission of power the conditions must be thoroughly considered beforehand, and the dynamo specially designed for the purpose. At the meeting of the board of directors of the company in May, 1893, I was instructed, with Dr. Sellers, to get out plans for an alternator of the type which I have described.

I am not able to lay before you now plans of the machine as it has been finally adjusted by conference between ourselves and the manufacturers. In the plan which we prepared, the frequency was 16⅔ periods per second, their being eight poles. The armature coils were so wound that they might be connected to give either 2,500, 5,000, 10,000 or 20,000 volts, and the coils were limited in number so as to give the best assurance of good parallel working. For various reasons we decided eventually to raise the frequency to 25, and to lower the volts to 2,000, without the means of connecting the coils to give a higher pressure; and, instead of winding the armature on the conductors in a limited number of coils, to adopt the methods more commonly used in some of the large types of generators. But since, in any future work which is done, the dynamo will be required to be modified for the special purpose, a description of the machine—of which I am able to show you the drawings—is sufficiently representative of the type of machine for our purpose.

On the bed plate a vertical cylinder is bolted, with projections to support the fixed armature and the bearings of the revolving part. The armature coils are wound independently and can be removed and changed. They are fixed in slots in the fixed armature. They are encased in an oil-tight casing, through which oil can be circulated. The field magnet is external to the armature, and has the poles pointing radially inwards. It consists preferably of forged steel, supported by a spider with eight arms, which may be of steel, with a covering of thin sheet metal, on which cups are provided for forcing air into the interior of the machine. The pole pieces are bolted on to the steel rim. The field coils are of copper strip, two coils being wound upon each pole, with a space between them for air circulation. The exciting current is applied by rings of tempered copper on the spider, having fixed brushes rubbing on them. The hub of the spider is firmly fixed to the upper end of the shaft. The spider supports the heavy rim by 16 studs and nuts. The shaft is supported by two bearings, each of which has four radial arms, which are bolted to four corresponding projections on the cast-iron cylinder. This cast-iron cylinder is bolted to the bed plate, and adjusted thereon by wedges. Besides having on it the projections for carrying the bearings on its inner side, it has on its outer periphery a series of vertical ribs, against which the stampings, or sheets of iron forming the armature, rest. It also supports the lower end plate on which the armature is built up, and the armature is keyed to it by a single key. The armature is wound drum fashion—that is, all on the outside. This enables the coils to be wound independently, and laid in their place, and also to be easily replaced in case of accident. In order to do this satisfactorily, the slots for each coil in the iron are cut, not radially, but parallel to each other. Each coil is encased in insulating material, which forms a tube through which oil may flow as in a transformer, but may be forced, in which case its circulation is maintained by a pump. Round the base of the machine there are two oil pipes, one being the inlet, the other the outlet. The inlet pipe is connected with a reservoir of oil in the power house. The outlet pipe leads by another pipe to cooling arrangements in running water, from which the oil is pumped to the reservoir. From the inlet pipe 16 brass tubes are led to the junction boxes at the bottom of the 16 coils; the 16 other brass tubes are led from the junction boxes at the top of the coils through the interior of the fixed armature, and bent over the foundation plate, and so connected to the outlet pipe which surrounds the bed plate. The bed plate is a single iron casting, and in order to enable it to be transported over the railways, it was necessary to limit its diameter, as shown in a supplementary drawing, which shows the improved oiling arrangements, which were worked out by my chief draughtsman at Niagara Falls, Mr. Bauman. The armature is built up of thin sheet iron, with ventilating spaces as shown on the drawing. The bolts which hold the armature together are eight in number, to be made of nickel steel, a metal which has the great advantage of being non-magnetic, and of very high electrical resistance and great mechanical strenghth. The amount of nickel is 25 per cent.

There are 16 armature coils, eight being of one kind, called "short" coils, and eight of another kind, called "long" coils, the length of wire on each coil being the same. The short coils are bent over at the end plate, and the long coils are wound in one plane and enclose the short coils. I find that if we are to have a very stiff field, with first-class quality of iron in the fields, each coil would consist of 72 turns of pure copper wire, No. 0, of the Brown & Sharpe guage, which gives a very low density of current and reduces the heating. In fact, it has been my view that in designing the machines for so great and permanent a work, every effort should be made to reduce the rise in temperature, even to far below what has ever been done in the past. The unequal expansions and contractions of materials in a machine of this kind are very injurious to its permanence, and affect the insulating material seriously. The layers of wire in the coils are separated by mica. Each coil, when wound, has strips of insulating material laid spirally round it, so that oil may circulate freely in the intervals, and the whole is encased in a casing of strong insulating material. The material which I prefer for this purpose is certainly Woodite, an eighth of an inch of which will not break down with 30,000 volts, and which is not acted upon by oil even at high temperatures. I have a record of tests with oil which are conclusive on this point. It is quite the best material I have seen for the purpose, though costly, and being a secret process, it may be difficult to ensure uniformity.

The frames of the bearings are of cast-iron, with four radial arms, which rest upon four projections cast on the vertical cylinder, and are bolted to them. By this means, when the field magnet with the shaft have been lifted out of place, the bearings can be twisted through an angle of 45 degrees in a horizontal plane and then raised out of place, leaving a space five feet in diameter, through which portions of the turbine shaft can be raised for repair. The bearings are oiled at the center by oil forced under pressure through a pipe. The oil is then distributed over the bearings by spiral grooves. A spiral groove is also cut in the hub of the frame, with a pipe at each end to admit of water circulation to cool the bushing. At two opposite sides of each bearing the bushing is made thin, and a rod of bismuth is soldered thereto; so that, if the bushing is heated, a thermo-electric current shall be created, which, by means of a relay, can ring a bell in the power house. When this occurs, water can be immediately admitted to cool the bearings, and the attention of the workmen is drawn to the necessity of an examination.

One of the parts which required most consideration was the material of which the spider supporting the field magnets should be constructed. The best plan is to make it of steel, for the sake of lightness, and to cover it with a copper covering, which might, I think, be spun; or, perhaps better, electro-deposited nickel might be used.

Between the pole pieces the space is filled up with a screen or plate of metal so as to direct the air ventilation only upon the parts which most require cooling.

The methods finally selected for oil circulation are shown in a separate drawing.

It will be obvious from this design, considering that the speed of revolution is 250 per minute, that great care has to be devoted to the balancing of the revolving parts; everything has to be calculated not only for a speed of 250 revolutions, but for double that amount, which is the maximum speed at which the turbines could possibly run—at which speed they might run through a breakdown of the governor, although this is an accident almost impossible to occur. Each of the revolving parts will, of course, be balanced individually, and I have suggested a plan for the final balancing which seems likely to be effective. A temporary bushing would be put in the bearings of India-rubber lined by a thin metal tube. The dynamo would then be rotated slowly and the balance adjusted in the usual way. The speed of revolution would be gradually increased—a new adjustment being made at each speed—until a speed of 500 revolutions a minute is attained, and when an adjustment has been made at this speed it is pretty sure that the balance at 250 revolutions per minute will be very perfect, and the mechanical friction reduced to a minimum.

As stated before, the oiling arrangements have been introduced not only to insure higher insulation and to preserve the insulating material, but also to lower the temperature as much as is possible, because every step we take in the reduction of temperature is an advance. These oiling arrangements may perhaps be adopted in the future, but at present we are not making use of them in the machines which are in process of construction. When we have had experience with these we may in future adopt the oiling arrangements; and as there is likely to be a great development in the direction of electric transmission of power in connection with the utilization of water power in many parts of the world, it has seemed well to me to put before you these details, so that they may be considered in other cases that may arise.

At a meeting of the board of directors in New York lately it was resolved, on the recommendation of the consulting engineers of the company, that the contract for two or three alternators, each of 5,000 horse-power, should be assigned to the Westinghouse Electric and Manufacturing Company, of Pittsburgh. I would wish to state how much we owe to Mr. Westinghouse and to his chief engineer, Mr. Schmid, for the zeal with which they have taken this matter up, and their desire to meet our views and to secure for us machines of which they felt they could guarantee the satisfactory performance.

Before leaving the subject of the dynamo, I would wish to point out that it has been designed for special circumstances in connection with the Cataract Construction Company's work. If a dynamo of the same type were being constructed for another place, it is certain that modifications would have to be introduced. I particularly draw attention to the fact that some trouble in getting out a good mechanical design arose from the necessity which existed of being able to provide a clear space of about five feet diameter in the middle of the machine without taking the whole machine to pieces, the object of this being to enable us to lift up portions of the turbine shaft which it might be required to put into repair. In any case where the long shaft existing in our case is not required, the design of the dynamo is much simplified, and would more nearly approximate to the first design of which a drawing is shown, but arranged for 33 periods a second.

The Illinois University.

The corner-stone of the new engineering hall, to cost $160,000, was laid at Champaign, Ill., on Dec. 13. Dr. R. H. Thurston delivered the principal address and said in part:

"Engineering is a learned profession. The work of the engineer, of the mechanic and inventor stands among the highest, most useful, and, therefore, most god-like, intellectual products of the human brain. The telegraph, telephone, all modern machinery, public works, bridges, buildings and all that make modern life and civilization are the outcome of scientific discoveries. It is coming to be the fact that the mechanic is learned in all the history, wisdom, and methods of his craft. The conversion of the craft of construction into the learned profession of engineering has been in progress only a short time. The inventor of the eighteenth century has become the systematic designer of the nineteenth century. The vocation of the Yankee jackknife has given place to systematic, learned engineering. The production of inventions has come to be a vocation worthy the mechanics and engineers of the day, and they are educated and trained to that pursuit. Men like Edison surround themselves with trained assistants. The characteristic movement of the nineteenth century is university education, and it now has the highest and best expression in the United States, and especially in those States having regularly chartered universities."

Electricity vs. The Canal Mule.

"Does yer know what's happenin' in de wurl ob science?"

"Deed, I doesn't," was the reply.

"Hain' yoh shamed, an' yoh workin' on er canal boat, ingaged in tendin' to de traffic ob dishere great country? Yoh bettah know; I tells yoh dat. Science is gittin' right into yoh bus'ness."

"How do you mean, Uncle?"

"Dey is runnin' canal boats by 'lectricity stid o' by mule, an' ef yoh ain' keerful yoh'll be shocked clean off'n de tow-path inter de woods."

"I ain' skeert."

"Yoh ain'?"

"No'n deed. I'd like fur tu hab de 'lectricity once."

"What foh?"

"'Case, ef dat 'lectricity kin shock any habdern' a mule kin kick, I dess wants ter see it. Dat's all; I dess wants ter see it."—*American Industries.*

LITERARY.

Hon. Robert C. Winthrop, of Massachusetts, who was Speaker of the House about half a century ago, has contributed to *Scribner's Magazine* for January his reminiscences of Daniel Webster, particularly in regard to his reply to Hayne and his general methods of preparation for his wonderful oratorical effects. Mr. Winthrop is one of the few men living who knew Webster intimately in his prime, and this paper is one of unusual significance.

Indifference to Boiler Firing and Management.

BY D. ASHWORTH, BEFORE THE ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA, NOVEMBER 21, 1893.

Observations extending over a period of a quarter of a century in a practical and professional way have presented opportunities to note, in the greater number of manufacturing establishments, a continuous decline in the grade of service of those in the positions of firemen and boiler room managers, this corps of operatives seeming, at least, to have remained in *statu quo*. The evil has become so glaring and the results so palpably fraught with disaster, destruction and waste as to warrant an effort to call the attention of those who desire to progress to the false and inconsistent position they occupy by permitting such a narrow policy in management, so widely at variance with true economy, ignoring directly that the better intelligence renders the more valuable, and, hence, more profitable service.

It goes without saying that, during the past 10 years, the concentration of efforts by scientists and eminent mechanics, looking to the more perfect development of the steam engine in its various types, has produced results which challenge the admiration of the most critical in this line of thought.

Within the same period, from every source, there have been a multitude of features in the form of designs and novel application of boilers, all converging to the important factors of increased economy, safety and efficiency. In the engine sphere, condensing, compound and triple expansion engines, with and without jackets; in brief, seemingly all the necessary refinements have received, and are now receiving, close attention. In the boiler domain there has been, also, the evolution from the plain cylinder type to tubular, and from that through the multifarious forms of water tubes, each striving for a superior degree of excellence. Combining these forces, viz., the boiler and the engine, the amount of research and practical application that have been, and are being applied for efficiency and economy are such as to be incalculable. A retrospect of the past, viewed in the light of present results, shows that these efforts have been of an exceedingly fruitful character.

The development has carried with it the imperative advancement of those in charge of engine management to such an extent as to create almost anew this body of men. Such an intellectual advancement in the department of mechanics, we believe, is without precedent, and in every sense challenges universal admiration from every quarter. Notwithstanding these favorable features, we are constrained to say that all this is somewhat like the play of Hamlet with Hamlet left out; or in other words, we are radically defective at the very threshold of this field, by reason of relegating the firing of boilers to the most ignorant of operatives; or, to put it in a plain way, there seems to be an almost unanimous idea that anyone who can shovel and throw fuel is good enough for a fireman. Close observation and contact for a period of years with numerous plants of varied character increases the conviction upon this point. Recognizing, as we all do, that the furnace of the boiler is the prime feature and great initial point from which is the source of power, does it not properly follow that, if economy and efficiency are deserving of efforts in the advanced stages, as has already been pointed out, this is the very point that should be treated with every consideration of intelligence? Should not the fuel, furnace and boiler receive the thoughtful attention that the engine receives from the careful engineer? I think this will be accepted by every one interested in advanced ideas. No one, I think, will question the fact of the importance of the initial point of the boiler and its furnace, and that, upon its mismanagement, the efforts of refinement are rendered, in many cases, completely void. It would seem so simple that argument would be unnecessary, were it not that, on every hand, the matter is entirely ignored, resulting in waste and destruction. We would ask: Are not the efforts of the best furnace designers completely set at naught often by reason of the manner in which they are operated? Is it not a glaring fact that, in all cities where smoke abatement has been, and is being attempted, the great stumbling block is the low grade of intelligence and indifference of the operatives?

In looking upon this subject from a mechanical and engineering standpoint, we are fully alive to all the requirements to give complete combustion and thorough distribution of heat units; proportion of grate area and openings, proper amount of air, conduction of the heated gases, are all carefully considered. When all is completed, we have had the wonderful spectacle of these conditions being turned over to the simple treatment of ram jam shoveling and slice bar operations. I claim that the fireman should know, at least, the elements of combustion, the importance of the proper management of fires to produce the greatest results with the least expenditure of fuel. The intelligent engineer keeps this constantly in view as to steam economy; the valves, etc., receive his unremitting attention, unless he should be a mere starter and stopper, for such a so-called engineer can properly be placed upon the same plane as the fireman that shovels without intelligence or judgment.

Now, it may be said that this is being greatly overcome by the application of mechanical stokers, a point that is frequently (and, I believe, without thinking) claimed by those interested in placing stokers. This is a great mistake, well known by those conducting tests, the results always being superior with the greater intelligence of the operator of the machine.

This deplorable and absurd state of affairs is doubly aggravated by, not simply indifference, but actual encouragement, based upon the idea that any one can shovel and throw in; or perhaps it is the idea of—they put it in the slot, and we do the rest. Does it ever occur to those proprietors, or the superintendents of manufacturing establishments, that while they are straining at gnats in the refinements of every application in the various departments looking to more economic results, right upon the threshold, they are swallowing a camel with the greatest ease?

Within the past few years, in every community where cleanliness, taste, and good health are considered, there has come forth a crying appeal to the authorities to lessen the great evil of smoke in the atmosphere. In response to this, inventive genius has promptly come forward. The multitude of devices that have been perfected and put in operation furnishes ample testimony of this fact. Many of these, when properly operated, accomplish satisfactory results in smoke abatement, but no inventor has ever had the temerity to label his machine or furnace "No skilled fireman required." Per contra, it is well known that the most intelligent fireman produces the best results, and it is also an undeniable fact that the best devices are set at naught by incompetent operating. The writer has been brought in contact with large fields of boiler practice, and in many cases, aside from other disqualifications, the firemen were unable to speak or understand a word of the English language. It may be said, as I have heard it said, that these men are not paid to think, but to do. Well, they do do. They will do up a coal pile, furnace and boiler with alarming rapidity. I say alarming to those whose views are broad enough to consider the initial and important points. On the other hand it is a lamentable fact that there are a great number of persons in official positions, as superintendents, and proprietors of establishment, who seem to be utterly incapable, or unwilling, to note the importance for the necessity for a higher grade of labor in the firing and management of boilers.

One of the most surprising features in connection with this state of affairs is the tendency of those interested to place boilers, claiming, among their numerous merits, that of less attention required than others, precisely on the old exploded idea applied to engines, "No skilled Engineer required." I have now before me a letter from a boiler representative who claims that his boiler will give the utmost satisfaction with one half the attention that others receive.

What is greatly needed at present is to lay aside the idea that anyone is good enough to fire and manage boilers. When you engage a man for your office, do you not require that he shall possess some qualifications for the position? And if aptness is shown, do you not show appreciation by advancement to a higher plane, the interest being mutual? Why not apply this to the selection of firemen? As it now stands, we cannot but exclaim, "Strange, what a difference there should be 'twixt tweedle dum and tweedle dee!"

There are a great many plants in operation where, by incompetency in this line, the steam efficiency is greatly lessened, furnaces and boilers working in neglected conditions, and the community begrimed with volumes of unnecessary smoke; and in addition to these evils, that of jeopardizing lives and property. Unless this matter is considered, and such action taken as will improve this corps of operatives, it would seem absurd to be continually reaching and extending into the higher refinements of steam engineering, when such simple and important features are ignored at the threshold.

Under these conditions, does not the pertinent question present itself to the employer—are we not occupying a false position by this seeming indifference? Do we not retard the development of a class of labor which, by recognition, by an appreciation that some skill and judgement are required, would be animated by the smallest spark of ambition to qualify for advanced positions? Is not this condition of affairs a gross inconsistency, nay, a mockery, in face of the query put by those guilty of this indifference—why can we not get better men than this? In reply to that, would say, simply, it is not sought on your part. Just as long as this class of operatives are looked upon as mere shovelers, throwers of coal and carriers of water, ignorance, with all its attendant waste, destruction of property and general demoralization, will be prominent in the boiler department.

LUNKENHEIMER'S "CROWN" OIL CUP.

As a fitting close to this, it would be proper to ask what degree of intelligence or knowledge would qualify one to fire boilers.

First. That the fires should be maintained with uniformity, and that no openings, in the form of bare places, showed upon the bars to permit the cold air to pass through.

Second. The judgement that will enable him, by a glance at the ash-pit, to know at once, to a great extent, the condition of the fires.

Third. He should know something of the various fittings of the boilers, such as valves, etc., and the details of the furnaces.

Fourth, but not least, an ambition to grasp the details, so as to qualify him for a still higher plane, which would certainly follow, provided there was judgement enough in the superior to note such details.

Sufficient, we think, has been said to convince the most obtuse mind that the indiscriminate employment of labor for this purpose is a crying evil, and some consideration given to the claims here made, that simply because one can shovel and throw, it does not follow that he is qualified to fire and have charge of steam boilers.

An Ideal Glass Oil Cup for Dynamos and General Engine Bearings.

Attention is called to the accompanying illustration, which represents Lunkenheimer's "Crown" index sight feed glass oil cup. This cup is provided with an "index" device for regulating the flow of oil and an indicator arm turning on the lid to mark the notch giving the desired feed. When desired, the feed can be instantly turned off and on again by replacing the index lever in the notch of the indicator arm. When the index arm is closed the lever can be left to stand up out of the notch, thus acting as an indicator to show from a distance that the feed is shut off.

As is often the case, a number of cups require different feeds, especially before starting an engine, when an extra amount of oil is wanted. This can easily be accomplished with the "Crown," without losing the original feed, by simply moving the indicator arm a few notches to the right, and when the established feed is again required, it is only necessary to replace same in the index slide, which marks the established feed.

These cups are all made of cast brass, handsomely finished, and are heavy and durable. The oil will not leak out between the brass and the glass parts, as is the case with many spun brass cups. Wherever they have been put in use, the makers report, they are giving the very best of satisfaction. They are made in eight sizes, holding all the way from five-eighths to 18 ounces of oil.

Besides the "Crown," this company makes seven other styles for various purposes, all of which are fully described and illustrated in a catalogue, which will be mailed to any address upon request. These goods are manufactured by the Lunkenheimer Company, of Cincinnati, O., whose specialties are well known for their standard of excellence.

TELEPHONE CHAT.

Trenton, Mo., wants telephone service.

A telephone exchange has been opened at Madison, N. J.

The underground system is now used for telephone service at Yonkers, N. Y.

Omaha, Neb., telephone service is now operating on the underground system.

Petitions for government telephone and telegraph systems have received numerous signatures in Auburn and Lewiston, Me.

It is reported that, beginning with the new year, the San Francisco telephone girls will be required to wear a uniform dress of dark blue or black.

Councilman Dow recently brought before the Oakland, Cal., City Council an ordinance providing that all telegraph and telephone companies must pay a license of $5 a year for every telegraph or telephone pole that is not located on private property.

Some of the corporations are doing work much to their disadvantage, in order to give the needy employment. Among them is the New England Telephone and Telegraph Company, which is now employing something over 300 laborers, putting their wires underground in Boston, Worcester, Salem and Newton, Mass.

An electric light wire falling across telephone wires in Chelsea, Mass., on December 16, caused a fire to start back of the switch board in the central office of the New England Telephone and Telegraph Company in that city. One section of the switch board was burned out, causing considerable inconvenience to a number of subscribers. The damage was temporarily repaired the next day, and a new switch board will be put in shortly.

The central electric lighting station at Melbourne, Australia, is approaching completion. Bids have just been invited for the supply and erection of electric light pillars, supply of fittings for the station, etc. The town of Eaglehawk is to be lighted by electricity.

The Walker Manufacturing Company Goes Into Electric Railway Work.

The Walker Manufacturing Company, of Cleveland, O., which has been actively engaged in the manufacture of cable railway machinery, is now making the necessary additions to its plant for the manufacture of the latest and most powerful types of generators and motors for electric railway and power transmission purposes ever constructed, not only in the United States but in foreign countries.

For a considerable period negotiations to this end have been going on, and to-day not only are the necessary additions for the electrical department about completed, but work is swiftly progressing upon new patterns of generators and motors which will shortly be placed upon the market.

This new departure of the Walker Manufacturing Company, while it will in no degree affect the output of their other specialities is far more significant than would appear at first glance. The company, in the production of its powerful cable machinery, including the world-famed Walker differential drums, the largest designs of hydraulic machinery, traveling cranes, mining and foundry plants, is easily foremost among corporations of its kind in this country. Its reputation for heavy machinery is, in fact, international. The entrance of such a company in the electrical field, fully equipped, and, moreover, sustained by a world-wide reputation, means a most potent factor whose influence must be felt from the very beginning.

One of the serious drawbacks encountered in the manufacture of generators of great capacity by existing companies, has been a lack of facilities for handling large work. The Walker Manufacturing Company's facilities are such as to place them at a decided advantage, when it is known that they have produced some of the largest work ever made in this country. They have cast safely and with ease, a 42 ton casting, and have capacity to make a 60 ton casting, if needed; from this some idea may be gained of its possibilities of handling the largest generators that may be required. Means of handling and constructing the largest generators entirely within the works of the company are advantages possessed by few electrical companies, and the importance of this can scarcely be over estimated.

As has been previously stated, the Walker Manufacturing Company's plant is most admirably adapted for the manufacture of high class electrical machinery, and although it has been described before in all its various departments, a later description of its most salient features cannot fail to be read with interest by all users of electrical machinery.

From the completion of the enlarged portion of the works in the Spring of 1891, dated practically its great constructive facilities. The plant with its subsequent additions now occupies fully 13 acres of ground. The location of the works in Cleveland is unsurpassed; that city possessing great natural advantages for manufacturing. The buildings are of brick, fronting upon Waverly avenue, and occupy a commanding view of Lake Erie.

The idea which one gets upon a survey of the Walker Manufacturing Company's works, is immensity; and this idea is fully sustained by the modern machinery with which the plant is equipped.

The machine shop, which is said to be the finest in the United States, is 171 feet wide, divided into three bays, each 57 feet. In length, two of the bays are 280 feet, and the third 430 feet. From the floor to the highest part of the roof is 54 feet; massive wrought iron pillars support the traveling crane girders and the roof, which is of iron and glass, thus affording plenty of light. In each bay is a 30 ton rope power traveling crane manufactured by the Walker Manufacturing Company for their heavy work. On all sides, one sees a bewildering array of machinery. In Bay A most of the fitting and erecting is done. A line of vises arranged on a continuous bench, 280 feet long, is rather an unusual sight; in this bay are arranged all the drill presses and similar tools used in fitting and finishing work. Large pits walled and paved with bricks are arranged for erecting work in them that would otherwise be inconvenient to get at. A 30 ton crane travels the entire length of this bay.

In Bay B are arranged all the large lathes, planers and floor boring machines. A 10 feet x 10 feet x 25 feet open side planer, using four tools if necessary, is a formidable machine. The floor boring and milling machine has a capacity of 14 feet horizontal and a six feet vertical lift and a six feet feed horizontally. The floor bed outside of the machine proper is 20 feet x 20 feet. Numerous lathes, planers and shapers are found in this bay. A 30 ton crane travels the entire length of this bay also.

In Bay C are boring mills of the following sizes: Seven feet, 10 feet, 14 feet, 16 feet and 16 to 24 feet capacity; horizontal boring and other machines; also a 10 foot Gleason gear planer capable of cutting spur or bevel gears 30 inch face. The immense pit lathe with which all the large gears, bolt and rope pulleys have been turned is in this bay. The large girders of the lathe are 90 feet long. All the driving gears of this powerful tool are of cast-steel. Two 33 feet diameter by eight feet six inch rope pulleys, each 104 tons, have been turned in this lathe at one time. A depressed railroad track from the L. S. & M. S. R. R. runs across this bay, so that cars and locomotives can run into the shop. Two immense platform scales are also arranged in this point for weighing shipments. Work is transferred from machines, scales, to or from railroad cars, with another 30 ton crane, which travels the entire length of the bay, 430 feet.

The machine shop is fitted with galleries for special purposes. Under one are arranged all the small lathes, which in itself is a fair sized machine shop. Under another gallery is the tool room fitted with all modern appliances.

On one of these extensive galleries is located all bolt and nut cutting machinery also. All bolts and nuts are carefully kept in stock. An immense storeroom is located at the east end of Bay B, and convenient to the office.

These shops have turned out upwards of 200 Walker patent differential drums, many of them displacing the old style solid drums. It is of especial interest to refer to these drums, because of their general adoption by the cable roads of America. It is now an established fact that by their use the life of cables have been increased from 6 to 20 months, and they have affected a saving in power of fully 37 per cent.

But this is only a small part of the great record made by the Walker Manufacturing Company.

In the matter of complete cable plants, they have supplied fully 20 different roads, among which may be mentioned the Twelfth and Eighteenth street plants of the Metropolitan Street Railway Company, of Kansas City, Mo.; St. Louis Cable and Western Railway Company; Butte City Street Railway Company; Union Railway Company; Kansas City, Washington and Georgetown Railroad Company, Washington, D. C.; People's Railway Company, St. Louis, Mo.; Portland, Oregon, Railway Company; Madison Street Cable Company, Seattle, Wash.; Valley City Railway Company, Grand Rapids, Mich.; Cleveland City, Ohio, Railway Company; Staples Coal Company, Fall River, Mass.; Tacoma, Wash., Railway and Motor Company; Dallas, Texas, Cable Railway Company; Brooklyn, N. Y., Heights Railroad Company.

The rope drive pulleys made for the Broadway Cable Company and Third Avenue Cable Railway, in New York, are the largest ever made in this country. They measure 32 feet in diameter, 8 feet 6 inches in width, and weigh 104 tons each.

The Walker friction clutches supplied for the Broadway Cable Road, the Third Avenue Cable Road, Cleveland City Cable Railroad Company, Blue Island Avenue Cable Road, Chicago, Brooklyn Heights Cable Road, New York, and Baltimore City Passenger Railroad Company, ranging from 400 to 1,200 horse-power each, are well adapted for connecting and disconnecting generators of large powers.

Although it may be an old story by this time, the capacity of the works for turning out spur gearing is worthy of repetition. A machine cut spur gear of 192 teeth claims the distinction of being the giant wheel of its kind ever placed in use, as will be seen by the following dimensions: 30.66 inches pitch diameter; 30 inch face; 6 inch pitch; 27 inch bore; diameter of hub, 9 feet 2 inches; weight of hub, 15 tons; weight of gear, 66.75 tons. This wheel was shipped by the Walker Company to the diamond mines of South Africa. It may be mentioned in this connection that pulleys and cable drums have been shipped to England and Australia.

The foundry of the company is 300 feet long, 118 feet wide, and is built in three bays. The center bay is 57 feet in width and 41 feet in height to the tie beams.

It has truly been said to be the model foundry of the country. Here, also, everything is on a gigantic scale. To move the ponderous castings, two 30 ton rope power traveling cranes are utilized in the central bay, while the side bays are provided with two 12 ton cranes each operated by separate engines. Another foundry, 58 feet by 200, adjoining is used for smaller castings. Absence of smoke and good ventilation is an important feature of the large foundry.

The metal for both foundries is supplied from four Walker improved cupolas of the following dimensions: Two 60 inches in diameter, one 72 inches in diameter, one 84 inches in diameter, affording a capacity of 80 tons of metal per hour.

The cupolas are built upon a scientific plan of economy and melt an average of 13.10 pounds of iron per pound of coke. The air is supplied from a three cylinder vertical blowing engine. Hydraulic power is used for breaking metal and elevating all the necessary coke, iron and limestone. The elevator will raise a load of six tons, the power being developed in a 14 inch accumulator of 14 feet stroke, with an average pressure of 1,000 to the square inch.

The core ovens are 24 by 30 feet, 20 by 30 feet and 18 by 25 feet, respectively. They are, of course, the latest design, and it is almost unnecessary to add that gearing and crank handles serve to operate the carriages.

Large casting pits are located at various parts of the foundry floor, ranging from 24 to 12 feet in diameter, and reaching a depth of 25 feet. The capacities of the crane ladles vary from three to 25 tons.

It is hardly within the scope of this article to go into minute details concerning the completeness in every part of the plant. It contains nothing antiquated or out of date, and new machinery to keep pace with its growth has been added whenever necessary, so that few alterations have been needed for the electrical traction and power department.

The list of its many specialties covers a most comprehensive scope, as shown by their three recent catalogues.

Inasmuch as a good share of the work done in constructing electrical machinery consists in castings, the foregoing description of its foundry will indicate the superior facilities of the Walker Manufacturing Company in its new department. In existing companies, it is rather the rule than the exception to purchase a portion of the castings for each machine, of outside foundries. In the present case, however, greater uniformity in its castings is secured, by doing the entire work within the plant, than could be obtained from various foundries managed with different degrees of skill. This advantage of the Walker Manufacturing Company will be immediately recognized when its electrical product is offered on the market, in the smoothness of the casting and general excellence of the finished work.

The type of motor to be offered by the Walker Manufacturing Company will, it is believed, elicit marked commendation and will admittedly be a distinct advance on existing machines. In the past there has been a somewhat universal feeling that the weight of the apparatus has been greater than either strength or electrical efficiency demanded.

This imperfection in other machines results very largely from an improper distribution of the metal. With the new generators and motor of the Walker Manufacturing Company particular care has been used in designing the castings, so that the maximum of strength and electrical efficiency, with the minimum of weight, may be obtained. It is confidently believed that as regards these three important features—lightness, efficiency and strength—the Walker Manufacturing Company's motor will be appreciated by those interested in electrical power and traction.

Mr. H. McL. Harding, of New York, and Mr. J. L. Barclay, of Chicago, are interested with the Walker Manufacturing Company in this department. Their continuous connection with the business of selling and manufacturing electric railway appliances from the very inception of the industry renders them well fitted for what they have undertaken. Having been connected with the Sprague Company in 1887, and afterwards with the Westinghouse Company, their exceptional and rare experience has enabled them to know thoroughly the faults of existing machinery, and is a practical assurance that the new type to be manufactured by the Walker Manufacturing Company will come as near perfection as human ingenuity and experience can produce. From the facts just stated, it is quite apparent that the machinery now being manufactured will not in any way be experimental.

Mr. John Walker, the founder, vice-president and general manager of the company, has had an exceptional and uniformly successful experience as a practical and mechanical engineer. He is a native of England, but has been a resident in this country for 25 years. Mr. Walker has taken out 62 patents for valuable machinery and mechanical devices, but his fame may be said to have been made upon his invention of differential drums for cable roads.

Mr. J. B. Perkins, president of the company, is one of the best known business men in Cleveland and elsewhere. His great wealth has made him a prominent factor in financial circles, while his executive abilities have long been recognized in the many enterprises with which his name has been associated. Mr. W. H. Bone and Z. M. Hubbell, respectively manager and treasurer of the company, have occupied their present positions for several years.

In the electrical power and traction department, Mr. Harding will be in charge of the Eastern business, with headquarters in New York. Mr. Barclay will have the management of Western business, located in Chicago.

Electric Railway Consolidation in Brooklyn, N. Y.

It is said negotiations are now under way by the Brooklyn, N. Y., Traction Company to secure control of the Jamaica and Hempstead plank road for the purpose of extending their electric railroad from Jamaica to Hempstead villiage. The traction Company is reported to have secured a 30 days' option on 1,240 shares of the Plank Road Company. Fifteen dollars a share is asked. The plank road connects Hollis and Queens. Secretary Thomas H. Clowes, of the Plank Road Company, thinks the purchase will be made. Another projected electric line is a branch from Huntington by way of Cold Spring Harbor to Oyster Bay. The distance is about eight miles and it is estimated the trip might be made in about 20 minutes. By means of this line the residents of Huntington and Cold Spring Harbor could take advantage of the reduced fare on the Long Island Railroad from Oyster Bay. A few days ago the Long Island Railroad Company awarded a contract for extending the Port Jefferson branch of its steam road 12 miles east to Wading river. They also propose extending the Montauk division eastward to Amagansett.

A direct-connected Westinghouse engine and generator at the World's Fair ran steadily for three months.

ADVANCE INFORMATION.

New Electric Companies Formed and Important Constructions Projected.

VALUABLE INFORMATION FOR MANUFACTURERS AND DEALERS.

We publish below the earliest information obtainable relating to new electric railways, new electric light companies and projected electric construction of all kinds. Every reader will find these columns of special interest, and manufacturers and supply houses will receive many valuable suggestions looking to new business by carefully watching this department in the ELECTRICAL REVIEW from week to week.

Electric Light and Power.

GENEVA, O.—The Geneva Electric Lighting Company has increased its capital from $15,000 to $25,000.

UNION HILL, N. J.—There is talk of organizing an electric light company at this place.

CONCORD, N. H.—The Mascoma Electric Light and Power Company has increased its capital to $135,000.

NEW YORK CITY.—The New York and East River Gas Company has been incorporated with the Secretary of State for the purpose of manufacturing and supplying gas for public and private purposes in New York city, and for manufacturing and supplying electricity for various uses. The operations of the company will be carried on in New York and Long Island City. The company has a capital of $700,000, and the directors are: Michael Coleman, Samuel B. Lawrence and William T. Barnard, of New York city; John B. Summerfield, of Brooklyn, and William C. Houston, Jr., of Philadelphia.

EAST BRIDGEWATER, MASS.—The Sheldon mill property, East Bridgewater, has been purchased by Boston capitalists, who will establish an electric light plant there. Work will be commenced at once.

New Electric Railways.

TIFFIN, O.—The Tiffin and Inter-Urban Consolidated Railway Company, of Tiffin; capital, $300,000, divided into shares of $100 each. The purpose is to construct and operate a street railroad through municipal corporations, counties and villages, and to carry passengers, freight, baggage, express and mail. The line is to be operated from Tiffin to Fostoria, to Upper Sandusky, Fremont and Norwalk. The incorporators are: Thomas B. Williams, Charles F. Shaw, Frank W. Brightman, Nelson W. Miller, M. Frost, Amandus Betts, R. W. Brown and T. T. Rosendale.

LONG ISLAND CITY, L. I.—The system of street railroads in this city owned and operated by the Steinway Railroad Company has been sold to a new corporation. The roads were controlled by William Steinway. It is said he retains a large interest in the new company. The principal men in the new company are: R. T. McCabe, president; Mr. Pruyne, president of the Commercial Bank of Albany, and Hollister & Babcock. W. P. Peabody, is vice-president and Mr. Babcock secretary of the new corporation. The system is composed of three routes. The company was only waiting for the completion of a new power house to introduce the trolley on all of its lines. The power house is situated on the East River front at Hell Gate. It is an immense building, and cost, without machinery, $40,000. It is expected to be finished by the end of this year. The purchase price has not been made public. It is said the same company is negotiating for the purchase of ex-Mayor P. J. Gleason's electric road that runs from this city to all the big Queen's County cemeteries. Mr. Gleason's road is considered valuable, owing to its excellent prospects.

GLENWOOD, PA.—A charter was recently granted to the Glenwood and Drawsburg Electric Street Railway Company; capital, $25,000.

LITTLE ROCK, ARK.—An attachment suit by the General Electric Company against the City Electric Street Railway Company was begun last week in the Pulaski Circuit Court. The suit involves the legality of claims aggregating nearly $300,000 against the railway company, which is now in the hands of a receiver.

PORTLAND, ORE.—The Northwest General Electric Company has begun proceedings for the appointment of a receiver of the East Side railway. The plaintiff holds a mortgage on the road for $66,000, and begun the suit because several small creditors have levied attachments on the road. The East Side company operated lines to Mount Tabor and Oregon City, about 30 miles in length. The assets are more than $500,000.

TIFFIN, OHIO.—Those interested in the consolidation of the electric railway interests in this city have decided to increase their capital stock from $300,000 to $400,000 and will forward incorporation papers to Columbus within a few days. The increase has been decided upon in order to construct a line from this city to Melmore and thence to Sycamore, 15 miles southwest of here. From that point the road will doubtless be extended to Upper Sandusky and likely from Melmore to Bucyrus.

ST. LOUIS, MO.—St. Louis is soon to have an elevated electric railroad. At a recent meeting of the council a bill was introduced granting a franchise to the National Unicycle Electric Railway Construction Company for the construction of an elevated railway from North Third street, near Round Top Market, through Forest Park to the city limits. The franchise is to continue 50 years, and the first 10 years the company is to pay the city $3,000 per annum, and the succeeding 10 years $5,000 per annum. Several well-known St. Louisans are backing the scheme.

BROOKLYN, N. Y.—The Brooklyn, Queens County and Suburban Company has been organized with a capital of $15,000,000, completing the consolidation of the different railroad companies in Brooklyn.

WASHINGTON, PA.—The Washington Electric Street Railway, of which E. N. Townsend, of Pittsburgh, was president, has ceased operations. The road for some time has been in the hands of a receiver, and that official will make an application to the court to sell the road. The line will probably be bought in by local capitalists.

WOONSOCKET, R. I.—It is probable that within a short time the Interstate Street Railway Company will pass into the control of the United Traction and Electric Company, owners of the Union Railroad Company, of Providence. The lines of the Interstate Company are 24 miles in length, and include lines from Pawtucket to Attleboro, Pawtucket to North Attleboro and the road through the Attleboros, known as the Attleboro, North Attleboro and Wrentham Railroad Company.

SIOUX CITY, IA.—The Consolidation Company has been organized. It has absorbed the Sioux City Cable Railway, and expects to consolidate all the street railway systems in the city. The company is capitalized at $1,000,000, with offices in New York and Sioux City.

OAKLAND, CAL.—The Oakland Consolidated Street Railway Company has made application to the city council to grant to it, its successors in interest and assigns, a franchise, privilege, right, right-of-way and permission, to construct, lay down, operate and maintain a street railroad in Oakland. The motive power to be used in operating the street railroad is electricity.

New Telephone Companies.

CONCORD, N. H.—It is reported that the Tilton and New Hampton Telegraph and Telephone Company will replace the telegraph instruments on its lines with telephones.

More Suits Against Users of Incandescent Lamps.

Suits have been filed in the United States Circuit Court for the Eastern District of Pennsylvania, by Richard N. Dyer and C. E. Mitchel, of counsel for the Edison Electric Light Company, of New York, and Samuel B. Huey, a solicitor of the Edison Electric Light Company, of Philadelphia, against the following respondents:

The Manufaturers' Club, of Philadelphia, the Philadelphia Trust, Safe Deposit, and Insurance Company, Trustee under the will of John Crump, deceased, owners of the Colonnade Hotel, and George J. Crump and Henry J. Crump, lessees, and the Spreckels Sugar Refining Company, a corporation doing business in the city of Philadelphia.

The object of these suits is not only to restrain the defendants from continuing the purchase and use of incandescent lamps which have been adjudged by decisions in various United States Courts to infringe upon the patents of Thomas A. Edison, but to compel an accounting for the purchase and use of infringing lamps in past year.

DASH, THE "ELECTRIC DOG."

Edison Electric Illuminating Company of New York.

The earnings of the Edison Electric Illuminating Company of New York for November show an increase in both gross and net results. The gross earnings in that month were $121,701.54, an increase over the corresponding month of 1892 of $20,642, and the net earnings were $65,585.84, an increase of $18,692.62. The total gross earnings for the first eleven months of the year amounted to $1,078,369.37, an increase of $238,601.20, and the net for the eleven months reached $506,710.29, a gain of $94,641.48. The gross earnings for the eleven months of 1893 ($1,078,369.37) compare with $839,768.17 in the same period of 1892 and with $579,391.72 in 1891. The net for eleven months of 1893 ($506,710.29) compare with $412,068.81 in the corresponding period of 1892 and $293,541.61 in 1891.

Electric Light Work in Colorado.

The announcement of the early commencement of work upon the Florence and Cripple Creek, Col., Railroad has revived the Florence Electric Power and Light Company. A meeting of a majority of the stockholders, representing $70,000, was held at the office of ex-Senator J. A. McCandless recently. An assessment was levied to raise money for the payment of the preliminary survey and to pay other incidental expenses. The company is in good shape, and will be ready to start its enterprise soon after work shall begin on the Florence and Cripple Creek Railroad.

Dash, the "Electric Dog," Escapes the Dog Catcher.

Dash, a cross between a St. Bernard and a collie, belongs to a New York restaurant keeper, and is a canine of many experiences. In 1889, when but a pup, he was playing in front of the restaurant. The telegraph wires were being taken down by order of the mayor and the streets were full of broken wires and poles. Dash was running in and out among the broken wires, when suddenly he struck a live one and that was the last that Dash remembered for several days. He lay across the live wire fairly burning up until the lineman cut off the current, and when his owner lifted him up and took him home he was to all intents and purposes dead.

Four dog doctors called and examined him and concluded that his sphere of usefulness was ended in this world, but when his master had given up hope somebody suggested that he take the dog into the yard and bury him up to his head in the earth.

Having very little confidence in the remedy, but ready to try anything, he buried the dog as directed. He left him in the ground for several hours and then was delighted to find that there was still life in him. The dog was carefully tended and finally fully recovered. Since this episode in his career Dash has been called the electric dog. He was presented to his owner when a pup by Bourke Cockran, the silver-tongued orator.

When in the street Dash always wears a strong collar with a barrel and silver plate on it and a leather muzzle. The muzzle is affixed to avoid trouble with the dog's natural enemy, the dog catcher. Dash's favorite abiding place is in front of the restaurant. He has many friends and several of them came handily to his help last week when a dog catcher tried to drag him off.

Dash sat in his customary place in front of the restaurant one morning last week, not suspecting that his natural enemy was lurking in the neighborhood, waiting a chance to seize the prize. Suddenly and without warning the dog catcher swooped down upon Dash, and, seizing him by the collar, attempted to carry him up the street to his wagon. But Dash was unaccustomed to such familiarity on the part of a stranger and justly resented it. He uttered one short, sharp bark, which brought his master to the scene, and then fought and struggled with his captor in an effort to escape.

Dash is a strong dog and well able to take care of himself under most circumstances, but here he met a man who from long experience in handling dogs knew not what fear was where they were concerned, and all of the dog's efforts to break loose were unavailing, until just as his master came to his assistance his collar slipped and slid off his head, carrying the muzzle with it, and Dash was at liberty.

When his owner saw Dash in the hands of one of the dreaded dog catchers he ran to the rescue. As he was accompanied by four waiters, the butcher from next door and several citizens who entertained strong prejudices against dog catchers in general, the latter's chances of getting away, with or without the dog, were slim, but just as they were about to chastise him a policeman came upon the scene, and on the owner's complaint placed the dog catcher under arrest.

The King of Catalogues.

The largest catalogue ever received by the ELECTRICAL REVIEW is that for 1894 just issued by the well-known machinery house of Manning, Maxwell & Moore, 111 and 113 Liberty street, New York. It contains 1,103 imperial quarto pages and nearly 6,000 illustrations. It is handsomely bound in red leather and cloth with gold stamping, and resembles very much both in size and make-up a volume of the *Century Dictionary*. The quality of paper and press work is very high, and fully in keeping with a work so complete and expensive. Everything in the way of railway and machinists' tools and supplies is illustrated and described. The value of such a catalogue to the patrons of Manning, Maxwell & Moore must be very great, and doubtless their customers' appreciation will be shown by an increased number of orders in 1894.

KINDRED INTERESTS

Charles A. Schieren & Company, 47 Ferry street, New York, are meeting with success in the introduction of their "Electric" leather belt stuffing and "Electric" leather belt cement.

The Central Electric Company, Chicago, report having secured some large construction orders in the last 10 days, and are having a thriving business in their Banner weather-proof wire, and have also secured the contract for the conduit and fittings and okonite wire for the finest residence in the State of Ohio.

The Joseph Dixon Crucible Company, Jersey City, N. J., has sent the ELECTRICAL REVIEW a Christmas present, consisting of a package of Dixon's "American Graphite" pencils, especially adapted for editorial work. If our editorials in 1894 read as smoothly as these pencils write, our readers and we will be pleased.

The Metropolitan Electric Company, Chicago, is mailing circular letters calling attention to the low prices they are enabled to offer purchasers desiring globes and shades for any system of electric lighting. It is making a special drive on porcelain branch and main blocks, lamp cord, tape and plain and plated carbons.

The Columbia Desk Calendar, which is issued annually by the Pope Manufacturing Company, of Columbia bicycle fame, is out for 1894, much improved in appearance. It is a pad calendar of the same size and shape as those of previous years, having a leaf for each day, but its attractiveness has been heightened by the work of a clever artist, who has scattered a series of bright pen drawings through its pages. It also contains, as usual, many appropriate and interesting contributions from people both bright and wise.

The Telephone Did Not Speak French.

"Our telephones are not educated to receive and transmit the French language," said a prominent young lawyer to the Gleaner the other day. When asked to explain himself, he told a good story on two of his fellow-desciples of Blackstone.

"Two young and rising attorneys," said he, "occupy adjoining offices in a large building here and are great chums. They are great students and occupy their evenings largely in study instead of going into society. French is the particular study that is interesting them at present, and they take lessons twice a week, from a prominent local teacher. He has encouraged them until they now think they are quite proficient in the language.

"Last week one of these legal luminaries announced to a circle of friends that he was to meet Emile Zola shortly. It astonished and delighted the circle to learn that so distinguished a person was to visit this city, and the attorney was asked when Zola would be here. He was not positive he said, but the French professor could tell. One of his listeners was so intensely interested that he determined to call upon the professor and ascertain for himself when the great author would arrive.

"He accordingly saw the professor and asked him when M. Zola would be in the city. The professor looked conscious and replied, 'On Thursday evening.' Next the question was asked where Zola would stop. It was now the professor's turn to be astonished and become the questioner.

"'Is he coming here?' he asked.

"'Why, I thought you telephoned to Mr. Q. that he was coming.'

"The professor began to laugh and answered:

"'No, no, no; I told him that my French lecture this week would be on Zola. That is all.'

"Both were now intensely amused at the evident blunder, but the inquirer thought he saw how it had been made.

"'Did you telephone in French, professor?' asked he.

"'Yes.'"—*St. Louis Globe-Democrat.*

The Edson Gauge Wins the John Scott Legacy Medal and Premium.

The John Scott Legacy Medal and Premium, held in trust by the City of Philadelphia, under the legacy of John Scott, of Edinburgh, to be used for the encouragement of "ingenious men and women who make useful inventions," provides for the distribution of a medal inscribed "To the Most Deserving," and a money premium in the sum of $20. Both have just been awarded to Jarvis B. Edson, of New York, for a pressure recording gauge, by the Franklin Institute, who have been delegated by the Board of City Trusts, of Philadelphia, to make investigations and awards.

The general adoption of these valuable instruments proves their indispensable nature, for in no other way can a proprietor place himself in a position to know how the steam pressure is carried during night and day, or how much inattention accompanies the firing. As it is a well established fact that carelessness and indifference at the furnace door wastes coal in an amount often sufficient to pay an extra dividend, to say nothing of loss in the cylinder from lack of initial pressure and proper economy from expansion of the steam, for the fireman little understands the necessity for maintaining high initial pressure. "Following" too far or "cutting off" too short are both wasteful of steam, and can only be controlled by the fireman carrying, uniformly, such a pressure on the boilers as the engine requires for the work it has to perform.

It is equally evident that such records, similarly produced, are as valuable where compressed air, water or other fluids are desired to be maintained under prescribed degrees of pressure.

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